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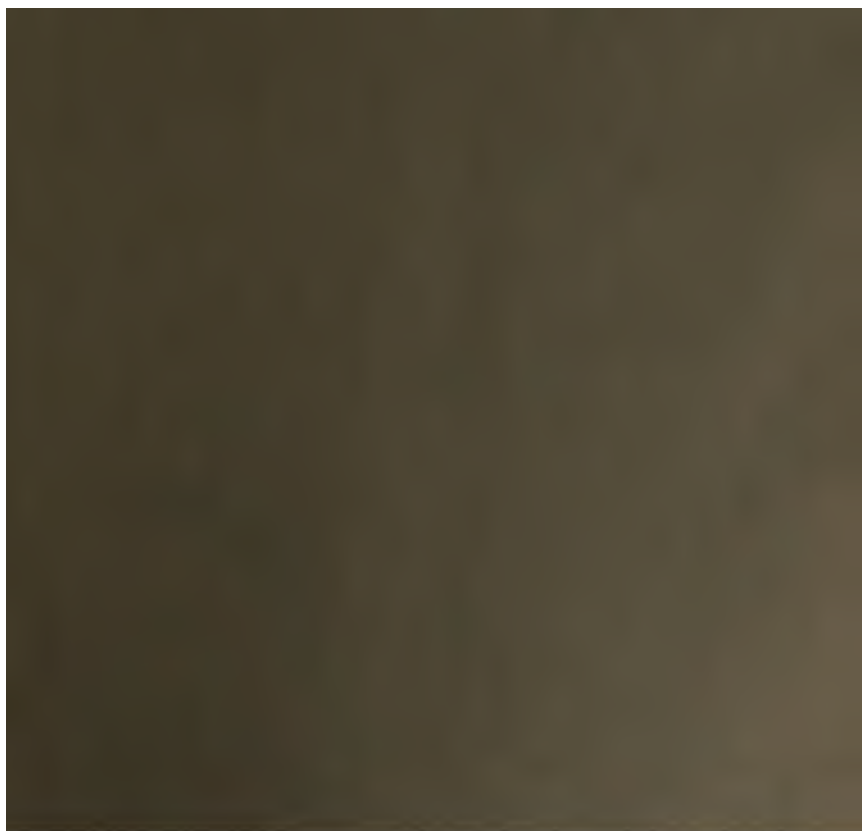


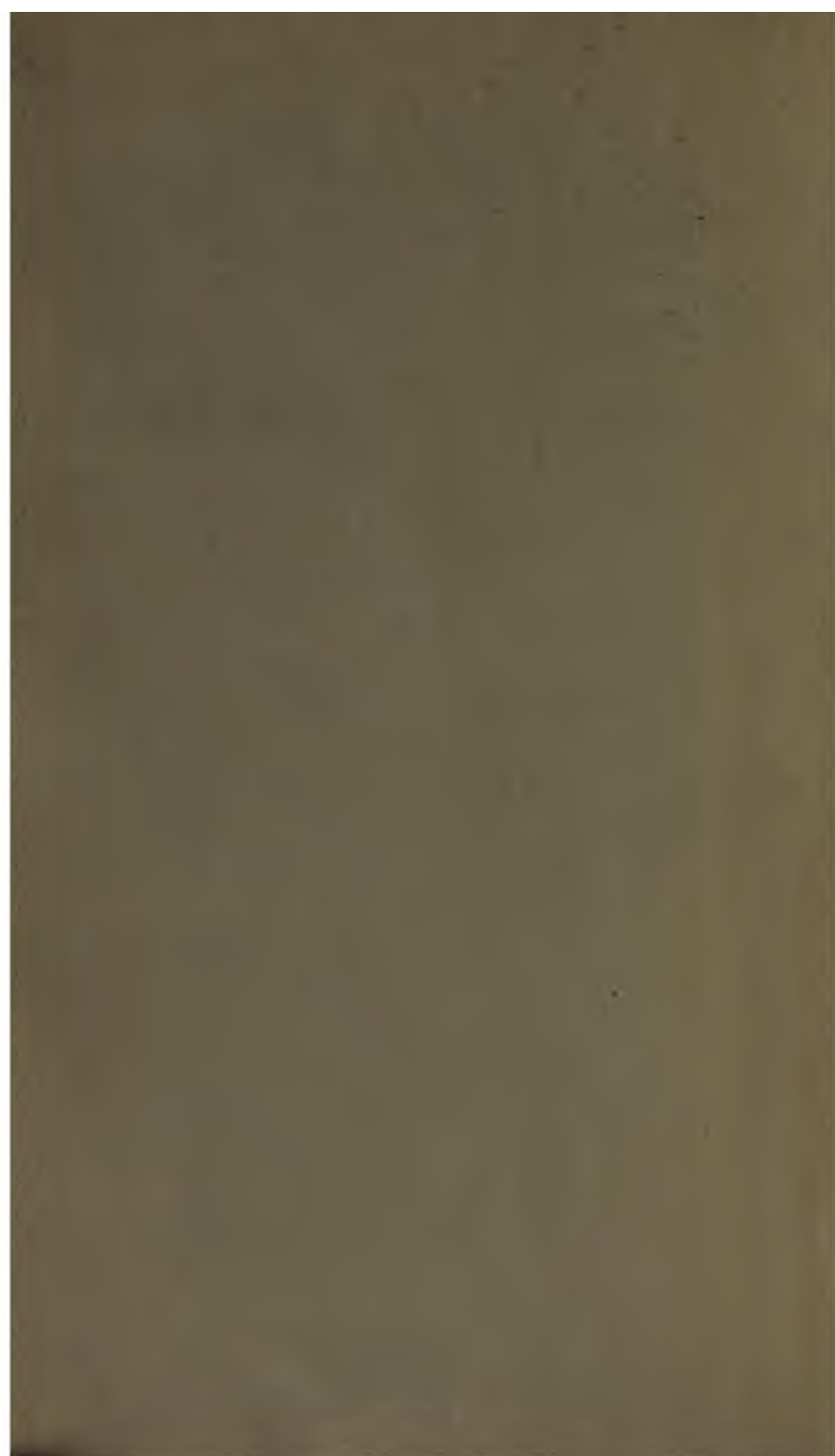
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"The Seas but Join the Nations they Divide."

THE
NAUTICAL MAGAZINE

FOR 1881.

NEW SERIES.

A JOURNAL OF PAPERS

ON SUBJECTS CONNECTED WITH

MARITIME AFFAIRS.

VOLUME L.

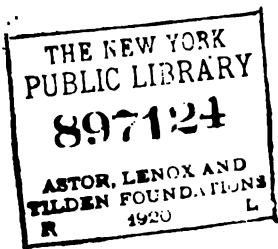
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FIFTIETH YEAR.

VOLUME L.—No. I.

JANUARY, 1881.

THE WEATHER OF THE AUTUMN, SEPTEMBER TO
NOVEMBER, 1880.

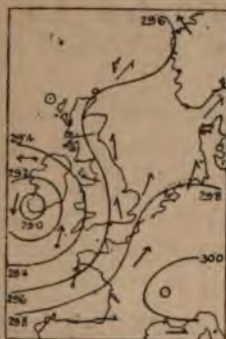


AFTER a spring and summer singularly free from serious gales, we have been visited during the autumn with storms, more than one of which developed unusual violence. It may, therefore, be of interest to give a brief notice of the weather of the British Isles during the past three months, from the especial point of view of the seaman, and to combine these with an estimate of the extent to which timely intimation of the gales which occurred was issued to the coasts, either from the Meteorological Office by means of its telegraphic warnings, or by the *New York Herald* through the newspapers.

The period under review commenced with fine weather and light westerly winds, the region of highest barometrical readings in Western Europe lying for the first three days over the north of France. Fog, however, was very prevalent in the English Channel during the time.

On the 4th of September the barometer fell briskly, except at the northern stations, and a fresh southerly wind set in over Ireland; a change which brought on in England the hottest day of the year, the temperature on the 4th at several stations nearly reaching 90°. After this, no features of particular interest

appeared until the 13th, when a wave of comparatively high pressure passed over our southern stations, followed by a rapid fall of the barometer in Ireland. During the night, September

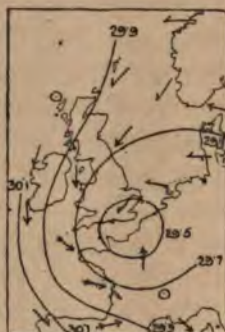


Sept. 14. FIG. 1.

13-14, the mercury fell as much as 0.7 in. at Valencia, and by 8 a.m. on the 14th (Fig. 1), we find a deep depression over the south of Ireland, with the readings at the above-named station below 29 inches. The greatest pressures lying over Switzerland, the steepest gradients were in the south-eastern direction, and the only gales reported in the morning were from S.W. at the entrance to the Channel, where the force was pretty stiff. This disturbance followed a rather erratic course, as we see



Sept. 15. FIG. 2.



Sept. 16. FIG. 3.



Sept. 17. FIG. 4.

from Figures 2-4, its centre being found near Yarmouth on the 15th (Fig. 2), not far from Havre on the 16th (Fig. 3), and over Denmark on the 17th (Fig. 4). It thus moved first eastwards, then slightly southwards, and finally travelled eastwards again. As it advanced over England, the S.W. gales already mentioned passed over northern France, but an extensive movement of northerly winds was produced in its rear, causing very heavy gales in the Irish Sea and at Scilly, as well as in the Bay of Biscay. At Holyhead the maximum velocity for an hour was 73 miles, from 1.30 to 2.30 p.m. on the 15th, the direction being N.N.W. This is nearly equivalent to force 11 of the Beaufort scale. The wind

blew with a velocity above 50 miles an hour for 31 hours from 3 a.m. on the 15th to 10 a.m. on the 16th, and was very gusty throughout, some of the squalls probably reaching the speed of 100 miles an hour. At Scilly the force was less than at Holyhead, but the duration of the gale was the same; at Falmouth the violence experienced was much less.

This disturbance was followed on the 18th by another, of small importance, causing slight S.W. gales in the Channel, but with that exception there was nothing calling for remark up to the end of the month.

The warnings issued during the month were as follows:—

FROM THE METEOROLOGICAL OFFICE.

Sept. 2, 7 p.m.	The west coast of Scotland was warned for a southerly gale.	Not necessary; only fresh breezes.
„ 13, 7 p.m.	The south coast of Ireland, with Cornwall and the Bristol Channel, warned for southerly gale.	Fulfilled.
„ 14, 10 a.m.	The rest of the English Channel and the east coast do. do.	Do.
	The Irish Sea and St. George's Channel, north-east gale.	Do.
„ 15, 10 a.m.	The Scotch stations, do. do.	Do.
„ 18, 10 a.m.	The south coast of Ireland, with Cornwall, Devon, and the Bristol Channel, southerly gale.	Do.

FROM THE "NEW YORK HERALD."

Sept. 1.	"Thunderstorms, attended by heavy rains, will prevail over the British Isles between the 2nd and 4th. The depression will pass north-eastwards."	Not necessary; no thunderstorm and no heavy rains between the dates.
„ 9.	"A disturbance is crossing, and will arrive with increased energy on the British and Norwegian coasts between the 11th and 18th. South veering to north-west gales, pos-	Fulfilled on 14th.

	sibly lightning. Heavy weather north of latitude 30°."	
Sept. 10.	"Unsettled weather will prevail North Spain, France, British Isles, between 10th and 17th. Numerous disturbances crossing between latitude 35° and 40°."	Fulfilled for 14th, nothing after 15th.
„ 19.	"A disturbance will arrive with increased energy on the British and Norwegian coasts between the 21st and 23rd. Rains; south veering north-west gales or strong winds; stormy north of 40° during ten days."	Not necessary; no gale on our coasts. Rainfall for these days below average.
„ 24.	"A disturbance will arrive on the North British and Norwegian coasts between the 25th and 27th, attended by rains, south-west veering to north, strong winds or gales."	Not necessary; light winds and very dry weather.

During the first three days of October northerly winds prevailed over the United Kingdom, under the influence of a depression which advanced to southern Norway, growing deeper as it moved southwards. On the morning of the 4th, however, a very general fall of the barometer at all the southern and south-western stations brought on fresh easterly winds in the south of these islands. The depression grew deeper during the day, and its centre advanced to the Bristol Channel on the 5th (Fig. 5), the easterly winds on the northern side increasing in force and extension, while over western France and our channel coast south-westerly gales, of moderate strength, were felt. This disturbance brought on torrents of rain in the south of England, in fact every where except in the extreme north. The force of the wind, however, at no station exceeded the figure 9 of Beaufort scale, as shown by the anemometrical records. It blew hardest at Scilly, but strong gales were felt at Holyhead and Yarmouth. The easterly gale gradually extended northwards, even affecting the

Moray Firth, where hard squalls from N.E. were reported during the night of the 5th-6th.



Oct. 5. (FIG. 5.)



Oct. 6. (FIG. 6.)



Oct. 7. (FIG. 7.)



Oct. 8. (FIG. 8.)



Oct. 9. (FIG. 9.)



Oct. 10. (FIG. 10.)

Meanwhile the depression had been modified in a very remarkable way. On the morning of the 6th (Fig. 6) an elongated trough, with three independent centres of depression, covered the region from Denmark to the Bay of Biscay; the readings in each of these areas ranging below 29.3 ins. During the day the eastern depression passed away over Denmark, that over the Bristol Channel disappeared, while that lying near Brest had become deeper, readings at its centre being below 29.1 ins. At the same time a wave of high pressure had advanced southwards over Scotland, the isobar of 29.7 on the 7th taking the position of that of 29.5 on the previous day. Accordingly gradients for easterly winds became steeper, and by the morning of the 7th (Fig. 7) a stiff easterly gale was blowing at Scilly, with a very

high sea, and one of lesser force from S.W. on the French coast. By the morning of the 8th (Fig. 8) the central portion of the disturbance had been filled up to the extent of 0.3 in., no reading below 29.4 being reported, but the position of the depression remained the same. The south-westerly gale still held over Brittany, while on our coast the wind had moderated. At 8 a.m. on the 9th (Fig. 9), the central area (with a reading of 29.5 in.) advanced to Cherbourg, while the easterly gales were again freshening up at Scilly and Yarmouth, but to no great violence.

During the course of the day the system advanced further eastwards, as far as Havre, and then retreated again, so that the morning of the 10th (Fig. 10) shows us the depression unchanged in position, but still further filled up, and the winds more moderate. During the day the system followed a very unusual course, moving out westwards over the Bay of Biscay, so that on the chart for the 11th no trace of its presence is to be found. The northern high pressure gradually developed itself into a definite anti-cyclonic system, which appeared first over Scotland, and then moved southwards, producing cold weather with a good deal of fog, and maintaining the easterly winds in the channel.

The excess of barometrical pressure gradually gave way during the week, and on the 19th a general fall of the barometer of about 0.3 in. took place, increasing to 0.5 in. at the entrance of the channel, where a depression appeared almost in the very same position as the anti-cyclone of the previous day (Figs. 11 and 12).



Oct. 19. (FIG. 11.)



Oct. 20. (FIG. 12.)

Northerly and north-west winds had been prevalent on the 18th, but this disturbance drew them into N.E. over England, producing a serious reduction of temperature (of 21° at Ardrossan, on the 19th), and bring-

ing on the almost unprecedented occurrence of a heavy snow-fall in the south of England, in the middle of October! Coming, as it did before the fall of the leaf, it wrought immense damage to the trees in many places, absolutely stripping many of the oaks on the Surrey hills of their branches.

This depression passed off eastwards, and was succeeded on the 22nd by another at the entrance of the channel, which was, however, of minor importance, though it caused some slight easterly gales on the coasts of Devon and Cornwall.

Another anti-cyclonic period supervened, the region of highest readings appearing first in the west, and then travelling in a south-eastern direction over France.

On the 25th, pressure gave way rapidly in the south-west, and during the next two days it continued to diminish seriously, while an area of low pressure gradually advanced to the southern Irish coast, causing strong easterly gales over that island. The process of development of this storm on our coasts is very well seen in (Figs. 13 and 14). The former shows the isobar



Oct. 26. (FIG. 13.)



Oct. 27. (FIG. 14.)

of 29.4 ins. off the south-western coast, while in the latter, we find that pressure has given way over western Europe generally, and that the isobar of 29.0 ins. has taken the place of that of 29.4 ins. on the previous day. The next chart,



Oct. 28. (FIG. 15.)



Oct. 29. (FIG. 16.)

that for 8 a.m. on the 28th (Fig. 15), shows the central isobar over the Bristol channel with a further reduction of pressure of 0.7 in., so that the reading is now as low as 28.7 ins., while an independent system of circulation exists near Hull. At this time, as we shall see when we deal with the winds, furious gales from the eastward prevailed in the north, while westerly storms of equal force were felt in the channel. Of these two depressions the rearmost filled up, while that shown on the east coast advanced over the North Sea, and at 8 a.m. on the 29th (Fig. 16), was found near the Helder.

From this to the end of the month there was nothing worthy of notice, but the features of the wind during the storm of the 27th, deserve more than a passing mention. On the southern side of the path of the centre, the westerly gales blew hard, but with no extraordinary violence, Falmouth reporting a maximum velocity of 50 miles an hour at 9 a.m. on the 28th, and Scilly, one of 49 miles two hours earlier.

On the northern side the N.E. gales were more severe, Valencia reporting a velocity from N.E. exceeding 50 miles, from 5 a.m. to 9 p.m. on the 27th, with a maximum of 56 at 8 a.m. In Great Britain the violence was worse; at Holyhead, though the extreme velocity of September 15th was not attained; the maximum being 65 miles from N. by E. at 6 p.m. on the 28th; a velocity exceeding 50 miles was recorded 10 p.m. 26th to 2 a.m. 27th, 8 a.m. 27th, to 2 a.m. 28th, and also 8 a.m. 28th, to 4 a.m. 29th, while the speed exceeded 60 miles for ten hours, from 4 p.m. on the 28th to 2 a.m. on the 29th. This regular lulling of the wind about 2 a.m. on three successive days is very remarkable.

At Seaham, where the force was the greatest recorded since the commencement of instrumental records at that place, the duration

of the gale was not nearly as great as at Holyhead, as the velocity exceeded 50 miles for only 20 hours, from 2 a.m. to 10 p.m. on the 28th, but for most of that period the velocity exceeded 60 miles an hour, and at 11 a.m. attained 74 miles, the highest registered during the storm.

At Alnwick and the Scotch observatories the violence was much less than on the Yorkshire coast.

On the whole the storm was by far the most destructive to shipping which has been felt for years past, and it has been asserted that so long a list of casualties had scarcely ever been seen at Lloyd's. This is due to the fact of its excessive violence on our exposed north-east coast.

The warnings issued during the month were as follows:—

FROM THE METEOROLOGICAL OFFICE.

Oct. 2, 7 p.m.	The north, north-east, and north-west coasts for a north-east gale.	Hardly wanted; nothing beyond a stiff breeze felt.
" 4, 9 a.m.	The south-western stations for an east gale.	Fulfilled.
7 p.m.	The Channel coast and south east, do., do.)	
" 5, 9 a.m.	The north, north-east and north-west coasts, north-east gale.	Fulfilled, except in extreme north, where only fresh breezes were felt.
" 6, 7.10 p.m.	The east and west coasts, with Cornwall, easterly gale.	Fulfilled.
" " "	The rest of the Channel coast for south-west gale.	Partially fulfilled, strong S.W. winds being felt.
" 9, 3 p.m.	The south-east coast for east gale.	Fulfilled.
" 10, 9 a.m.	The coasts of Devon and Cornwall, do., do.	Do.
" 14, 7 p.m.	The extreme north for a south-west gale.	Not necessary.

Oct. 20, 10 a.m. The east coast and eastern part of Channel,	east gale.	Fulfilled on Channel coast, but ought to have been extended to Scilly. On the east coast only strong breezes felt.
„ 22, 10 a.m. The south coast,	north-east gale.	Fulfilled.
„ „ 7 p.m. The southern parts of the east and west coasts,	do., do.	Only strong breezes felt.
„ 26, 7 p.m. The east and west coasts,	north-east gale.	Fulfilled.
„ „ 7 p.m. The south coast,	south-west gale.	Do.
„ 27, 7 p.m. The north coast,	north-east gale.	Do.
„ 28, 7 p.m. The east coast (repeated)	north-east gale.	Do.
„ „ The south coast (repeated)	south-west gale.	Do.

FROM THE "NEW YORK HERALD."

Sept. 30. "A disturbance will arrive on the British and Norwegian coasts, possibly affecting the French coasts, between the 2nd and the 4th inst., attended by rains, S.E. veering W. gales or strong winds. Another follows closely in northern districts. The Atlantic stormy north of 40°."	Not correct. A depression arrived on the 5th on the south coast and produced easterly, not westerly, gales.
Oct. 8. "A disturbance, preceded by depression, will arrive on the British and Norwegian coasts, affecting the French coasts, between	Not necessary; no gale, and weather in Bay of Biscay calm.

- the 11th and 13th, with rains, and south veering north-west gales. Unsettled weather in the Bay of Biscay several days after the 10th."
- Oct. 11. "A cyclonic storm, of unknown energy, is crossing south of 45° , and will probably affect the Spanish, French, and south British coasts between the 13th and 15th instant."
- Not necessary.
20. "A disturbance is crossing, which will probably develop energy and arrive on the north British and Norwegian coasts between the 21st and 23rd, south veering to west, strong winds or gales, rain, snow."
- Not necessary; only a slight *easterly* gale at the entrance of the channel.
25. "A dangerous storm is crossing north of latitude 45° ; will arrive on the British and Norwegian, possibly affecting the northern French coasts, between the 27th and 29th, attended by south strong winds veering to north-west gales, rain and snow in the north; low temperature follow; Atlantic very stormy."
- Track of this storm miscalculated. The storm came to the south coasts, producing *easterly* gales, and not affecting Norway.
29. "A disturbance will arrive on the North British and Norwegian coasts, between the 30th and the 1st, attended by south veering north strong winds or gales; rain or snow."
- Fulfilled; but gale not serious.

November opened with a high barometer, light winds, and bright weather. On the 3rd, however, an *easterly* gale was reported over the Bay of Biscay, but it scarcely affected our channel

coasts. Temperature was much below the mean in all districts during the first week.

On the night of the 8th an extensive depression advanced to the north coast of Scotland, causing at several stations westerly and north-west gales, but of no great consequence.

This disturbance, however, produced no material reduction of pressure over the United Kingdom, which continued high until the 12th, when a general fall of the barometer occurred, and on the 13th and 14th stiff westerly gales, with heavy and general rain, prevailed over all the centre and south of England. On the 15th a wave of high pressure, accompanied by a sudden fall of temperature, exceeding 20° in Yorkshire, preceded the arrival of a deep depression whose centre at 8 a.m. on the 16th (Fig. 17) lay near Holyhead,



strong southerly winds in Ireland, but without much rain. On this day, however, a general fall of the barometer of about half an inch occurred over the entire kingdom, while, what is somewhat remarkable, temperature was almost unaffected, and the sky consequently remained clear, hardly any rain being reported. Next day the thaw came with some rain and a farther fall of the barometer.

For the next few days we had the ordinary conditions of south-westerly winds in winter; the barometer being low in the north-west, while the wind was strong, blowing as a gale in some parts, all along the Atlantic coasts.

On the 25th an extensive area of low pressure lay to the northward of Scotland, all the readings north of the Grampians reading below 29 ins., but the depression was so general, and readings so uniformly distributed, that no very serious gale ensued. During the day the barometer rose again, but at 6 p.m. the wind, at Valencia, had backed to South and the mercury to go down, the sure sign of a fresh storm, which came on during the night, force 11 being reported from several stations. At 8 a.m., on the 26th



Nov. 26, 8 a.m.
(Fig. 19)



Nov. 26, 0.45 p.m.
(Fig. 20).

(Fig. 19), the curve of 28.5 ins. just skirted the western Scotch coast, but as the day wore on the barometer continued to fall over the Hebrides, and to rise briskly in Ireland, so that at 0h. 45m. p.m (Fig. 20), the unusually

great difference of 0.8 in. existed between Mullaghmore and Stornoway, the reading at the latter station being as low as 28.22 ins. Of course a furious southerly gale was felt over Ireland and western Scotland, which in some places was asserted to have equalled the Tay Bridge storm. It is very remarkable that this gale was practically a dry one, many of the stations reporting "blue sky" during

the 26th. At Aberdeen and Wick, notwithstanding a southerly gale of force 10, the rainfall of the 26th and 27th taken together did not amount to a tenth of an inch. The wettest Scotch reporting station on these days was Nairn, and there the fall was only 0·63 in. To show the contrast between these conditions and those which accompanied the storm of October 27, we may say that the rainfall at Holyhead during the 24 hours ending at 8 a.m., October 28, was 2·87 in., certainly a most unusual amount.

As regards anemometrical results the velocities recorded were not very remarkable, considering, as has already been said, that force 11 was recorded at three Irish stations, Valencia, Parsonstown, and Mullaghmore, as well as at Ardrossan. At Valencia, however, the velocity reached 75 miles an hour at 5 a.m. on the 26th, and even at the inland station of Armagh the, for that locality,



very unusual velocity of 56 miles an hour was recorded at 9 a.m. The only other anemometer lying in the track of these violent winds was Glasgow, and there the gale raging at Ardrossan was comparatively unfelt, for the velocity only exceeded 40 miles for eight hours, and never rose higher than 51 miles, a speed much less remarkable at Glasgow than at Armagh.

The depression passed off as rapidly as it had come, the barometer at Stornoway rising 1·10 in. in the 19 hours from 0h.45m. p.m. on the 26th to 8 a.m. next morning (Fig. 21), at which hour the lowest isobar seen on the chart was that for 28·8 in., and it skirted the coast of Norway from Christiansund to Bodö. The chart is not large enough to show the latter station.

The subsequent days of the month presented no features worthy of notice; the weather was mild, and on the whole dry.

The warnings issued during the month were as follows:—

FROM THE METEOROLOGICAL OFFICE.

Nov. 2, 7.20 p.m. South coast with the Bristol Channel and South of Ire- land,	Not necessary, only strong winds easterly gale. were felt.
--	--

Nov. 6, 2 p.m. North coasts of England and West Ireland, with Scotland, west gale.	Fulfilled, but gale not serious.
„ 9, 10.20 a.m. Same coasts, west gale.	Fulfilled, but signals hoisted late at a few stations.
„ 12, 7.15 p.m. South-west coasts, south-west gale.	Fulfilled, but warnings should have been extended to Irish Sea.
„ 13, 3 p.m. East coast and eastern part of Channel, south-west gale.	Fulfilled for Channel, not necessary for east coast.
„ „ 7 p.m. Irish Sea, and north of Ireland. do., do.	Not necessary.
„ 15, 7.20 p.m. South-coast of England, with Bristol Channel and south of Ireland, west gale.	Fulfilled.
„ 16, 11 a.m. The coasts of Scotland, with the north-west and north-east coasts of England and Ireland, west gale.	Wrong. "West" issued instead of "East."
„ „ East coast, south of the Humber, west gale.	Not necessary, nothing beyond a very slight gale felt.
„ 18, 10.30 a.m. The Bristol Channel and the coasts of Devon and Cornwall, north-east gale.	Fulfilled.
„ „ 2 p.m. The eastern part of the Channel, and the south coast of England, ditto.	Fulfilled.
„ „ 3 p.m. The south coast of Ireland, north gale.	Not necessary.
„ 21 9.40 a.m. The coasts of Scotland and Ireland, and the west coast of England, southerly gale.	Fulfilled.

Nov. 23	7.10 p.m. The west coasts, with those of Devon and Cornwall, south gale.	Not necessary; only strong breezes.
„ 24,	7.30 p.m. The west coasts of the three Kingdoms, south gale.	Fulfilled.
„ 25,	7.20 p.m. The east coast of Scotland, with the rest of the English coasts, south gale.	Fulfilled.
„ 27,	7.10 p.m. North-west coast of Ireland, south gale.	Fulfilled.
„ 28,	9.30 p.m. The coast of Scotland with north-east coast of England. The south coast of Ireland, and the entrance of the Channel, south gale.	Fulfilled.

FROM THE "NEW YORK HERALD."

Nov. 1.	"A dangerous storm is crossing, will arrive on the British and Norwegian, affecting the French coasts, between the 4th and 6th, attended by east, backing north-west gales. Rain, possibly snow in the north. Atlantic very stormy north 40°."	Not necessary; no such gale came.
„ 9.	"A disturbance will arrive on the British and Norwegian coasts, between the 11th and 13th, attended by south-east, veering to north-west gales. Rain, snow, heavy weather, north 40°."	Fulfilled; a westerly gale came on the 13th.
„ 14.	"A disturbance will arrive at the north British and Norwegian coasts, between the 15th and 16th, attended by south, veering to west gales. Rains, and possibly snow in the north."	Fulfilled by storm of 16th, but its centre came over Central England.

Nov. 17.	"A disturbance of unknown energy is crossing south of latitude 35°, and will affect the coasts of Spain and Portugal, between the 19th and 21st."	Not necessary.
„ 21.	"A disturbance is crossing north 40°, is likely to develop energy, and arrive on the British and Norwegian coasts between the 22nd and 23rd."	Fulfilled for the west coasts, but not for England.
„ 22.	"A dangerous storm is crossing north of 45°, will arrive on the British and Norwegian, possibly affecting the northern French, coasts, between the 25th and 27th, preceded and attended by gales, rain, snow. Atlantic very stormy."	Fulfilled by storm of 26th.

We see, therefore, from the foregoing sketch, that during the period under review, we have been visited by several severe storms; two of which, those of October 27 and of November 26, were unusually violent, the former being especially destructive to shipping.

As to the extent to which warnings were issued to the coasts, the Meteorological Office issued timely announcements in almost every instance; but on several occasions the warnings issued were not required, and in one, a warning for a westerly gale, was sent out in error to the Scotch coasts on the 16th of November, when the only wind which could have blown was from the eastward! As to the *Herald* warnings our rough analysis shows that many of the depressions which they announced did not affect our coasts, or at least were of such slight importance as to cause no damage to shipping. At the latter portion of the period the disturbances came more nearly as foretold; but a comparison of the warning which preceded the storm of October 26, will prove, if proof be needed, the difficulty of forecasting correctly the path of a depres-

sion across the Atlantic. The warning was for a westerly gale, the wind felt over all but the south of England was easterly. On the whole, therefore, while we fully recognise Mr. Bennett's great public spirit in transmitting these announcements, we cannot see that their utility to our coasting seamen has materially increased during the period for which the service has been kept up.

SIGNALLING BY MEANS OF SOUND.*

BY E. PRICE-EDWARDS.



SIGNAL is defined as a sign which has been agreed upon to give notice of some occurrence, command, or warning, to a person or persons at a distance. The necessity for such means of conveying intimations is too obvious to be dwelt upon. I need hardly recall to you the system of signalling by beacon fires, which was so extensively in use in early days; nor need I remind you that those crude methods of ancient times have, in the process of time, been generally superseded by simpler and more effective means. The splendid lighthouses on our coast, which convey guiding and warning signals to the mariner; the coloured and other lights used for vessels at sea, and also for railway purposes; flashing signals, employed for communicating between H.M. ships at night, and for other purposes, are all suggestive of ancient practice, although more elaborate and perfect, and suited to modern requirements.

Flags, again, have for centuries been used as emblems and signals for the conveyance of messages across intervening spaces. For military purposes they continue to be used, and for service at sea they have been so effectively utilised that there now exists an international code, generally adopted by all maritime nations, which permits conversation to be carried on between ships of all countries, the combinations of eighteen flags and three pennants

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being the signals whereby messages pass between mariners who do not even understand each other's language.

The semaphore was once much used for military signalling, but it is now almost entirely employed in connection with the railway service.

For storm warnings, drum and cone shapes are hoisted at prominent points on the coast, to indicate the approach of bad weather.

And I may allude to the valuable invention of the heliograph, or sun-flashing mirror, which rendered such conspicuous service in the late wars in Afghanistan and South Africa, by which signals can be flashed across an intervening space of from 50 to 100 miles.

Finally, signals of distress are made on board ship by the firing of rockets, and by flames on the deck.

It will be observed that the examples of signalling to which I have alluded are those which appeal to the sense of sight only. Signals, being intended for human purposes, are, of course, dependent upon human perceptions for their comprehension. Sight, as we have seen, is made available.

But the necessity for transmitting signals has been found to exist at times when sight is unavailing, and then the sense of hearing naturally suggested itself as the perception which should be appealed to.

The effective employment of sound-signals appears to be chiefly dependent upon two factors, the facilities offered by the atmosphere as a vehicle of sound, and the human capacity for hearing and distinguishing sounds of different characters. It will, perhaps, be convenient to regard first these two points, and afterwards to deal with the application of sound signalling for various purposes, and the different kinds of instruments used to produce the sounds.

The atmosphere is the vehicle for transmission of sound with which we are this evening concerned. Water is an excellent medium for sound travelling, and the possibilities which have from time to time been suggested in regard to it, require only the attention of inventive genius to bring them within the range of practical reality and utility. But as at present the atmosphere is the only medium which is practically available for the transmission

of sound signals, it becomes important to know whether some conditions are more favourable than others for its passage.

It is evident that there are various influences which may be supposed, in one way or another, to affect the transmission of sound. Wind has always been known as a most powerful agent in intercepting and even diverting it. Fog, snow, and rain, have also been regarded by many as serious obstructions, while it has long been popularly considered that a bright, warm, sunshiny day, with little or no wind, was exceptionally favourable for the travelling of sound. These views, it may be said, have grown up as the result of general expectation rather than of scientific observation; but the development of signalling by means of sound has necessitated a more exact inquiry, than has hitherto been made, into the general subject of sound transmission, and the result has been that some of the old theories have been considerably shaken, if not overthrown, while new ones have been set up.

In the years 1873 and 1874, an investigation was carried out, at the instance of the Trinity House, with the object of obtaining some definite information as to the relative merits of sound-producing instruments, and also of ascertaining how the propagation of sound was affected by different meteorological phenomena. Professor Tyndall, as the scientific adviser of the Trinity House, conducted the investigation, aided by a Committee of the Elder Brethren, and some officers of the Corporation. The experiments were extended over a lengthened period, observations being made in all conditions of weather, and repeated over and over again, in order to eliminate error; and the information gained thereby is of the highest interest and importance.

The results are stated at length in the third edition of Dr. Tyndall's book on "Sound," but may be popularly summarised as follows:—That neither rain, hail, snow, or fog, has any sensible power to obstruct sound. From this it is most satisfactory to know that, at those times when a sound signal might especially be of service, the sound is not likely to be obstructed in its passage. That the real obstructors of sound are—first, the wind; and, secondly, what Dr. Tyndall has named acoustic clouds. These clouds have nothing to do with ordinary clouds, fogs, or haze, and

may arise from air currents differently heated, or from air currents differently saturated with vapour, and they often exist on days when the atmosphere is in a very transparent condition. The obstruction is caused by the sound, intercepted by the acoustic clouds, being wasted by repeated reflections. In short, it is now established that a bright clear day is not necessarily the best for hearing distant sounds, and that on a day of dense fog it is more than probable that no obstruction is offered to the passage of sounds.

I must not omit to mention that experiments of an elaborate nature, in respect to the propagation of sound in the atmosphere, have also been made under the auspices of the United States Lighthouse Board, with results mainly corroborating those obtained in the Trinity House trials.

One other point may appropriately be alluded to here, viz.—as to the nature of the sound which is most readily propagated through the air, and which, therefore, is most effective for signalling purposes. It appears that what Mr. Alexander Beazeley (who very ably treated this subject of coast fog-signals some years ago) has termed "effective sound range," is made up of two factors, viz., intensity and pitch. It is tolerably well established that initial intensity is the first thing needful, and initial intensity depends upon the actual force employed in creating the sound waves. With suitable apparatus, and an effective application of very high power, there is little doubt that sounds of overpowering loudness may be produced. But the effective range of sound appears to be also controlled by its musical pitch. The short waves of a very shrill or high-pitched sound may appear extremely powerful and effective to observers in the immediate vicinity, but their energy seems to be quickly dissipated, and the sound fails to be appreciated effectively at a distance. Again, the long undulations of a very low-pitched sound do not apparently often reach great distances. It may be that this kind of movement is more readily acted upon by opposing influences, such as reflection or diversion. But, for practical purposes, it seems that the pitch best adapted for signalling lies about the middle of the scale of sound. With sound, as with

light, there are wave motions above the highest pitch intelligible to the human ear, and below the lowest sound audible, and it may be, that the nearer sounds approach the limits of human apprehension, so they tend to become less appreciable. In addition to this, it has been found that the atmosphere exercises a selective influence, and, within certain limits, will, under some conditions, favour the transmission of the shorter waves, or high-pitched note; while, at another time, it may be found that the longer waves of a low-pitched note have the advantage.

Speaking generally, the range of sound seems to be attended with much uncertainty. It is popularly supposed that if a sound, at any one time, is heard ten or fifteen miles, it must necessarily be an exceedingly powerful sound. Now, this does not follow as a matter of course. The variability of the atmosphere will throw out any calculation made upon such an hypothesis. In the experiments at South Foreland, in calm, clear weather, one of the instruments was, on a certain day, heard at a distance of $16\frac{1}{2}$ miles, but on another day, with apparently identical weather, the same instrument was heard at only $2\frac{1}{2}$ miles distance. Obviously it is no satisfactory test of a good signal that on one occasion it had a great range—sounds comparatively small and weak have at times been audible at long distances. The true test of a sound signal appears to be that it shall, under all conditions of weather, be uniformly effective at a short distance—say, two miles.

I referred just now to what, perhaps, I may speak of as the sound spectrum, and to the limits of human capacity in regard to hearing sounds. Now, with the development of signalling by means of sound, I am not sure that the human capacity for hearing and distinguishing sounds of different kinds has received the consideration which it merits. Let it be granted that you have instruments capable of producing sounds of great power; let it also be granted that the signals appear to be distinctive and easy of comprehension, you will, I fear, still find very many people in the world incapable of availing themselves of such signals, either by reason of whole or partial deafness, or inability to appreciate differences in sounds. Now, the question almost naturally asserts itself, cannot something be done to assist the ear, or at any rate,

the perception of sounds in the air. This seems to be the complementary side of the general question, to which but little attention has been given. In regard to visibility, you have telescopes, and binocular glasses, by means of which a distant object can be brought more plainly into view. But nothing of any real value has been done to assist the hearing. The old-fashioned ear-trumpet for deaf people is little, if at all, improved. Some years ago, an effort was made in this direction by a gentleman from Glasgow, who devised what he termed a phonoscope. This instrument consisted of a sort of metal helmet for the head, with an opening like the bent cowl of a chimney, which could be directed towards any point required. This cowl was supposed to act as a sort of ingatherer of sounds, which were conveyed to the ears by two small tubes, each terminating in a button, intended to go just inside the ear. The faults of this apparatus were, first, its cumbersome, and, secondly, the remarkable way in which all the ordinary small noises around were collected and magnified into large ones, which, combined with other sounds hitherto unheard, created a general uproar in the ears. The object this gentleman had in view deserved greater success than it obtained. He wished to assist the mariner in picking up and locating a distant sound; and, although his apparatus acted so well that it picked up noises of all kinds, and somewhat bewildered the sense of audition, yet I venture to say that if any one were to accomplish successfully what this gentleman so perseveringly attempted, a very great public benefit would be brought about. I do not mean to convey that what is specially wanted is an improved ear-trumpet for deaf persons, but, rather, an instrument intended to aid people with fair hearing, or to render sounds, in some way, more easily perceptible. The late Professor Henry, of Washington, in carrying out his experiments, devised what he termed an artificial ear, by which the relative power of different sounds could be determined at short distances. This instrument consisted of an arrangement by which sand, on a stretched membrane, assumed certain definite forms, or was more or less agitated, in response to different sounds. As a phonometer, at short distances, this instrument appears to have been fairly effective, but it does not meet the want which

appears to me to exist. With the growing use of sound for various purposes, there is scope for inventive genius to produce a phonoscope, which shall be capable of assisting the listening ear in a manner analogous to that by which a telescope aids the seeing eye.

The following is a general statement of the chief purposes for which sound signals of different kinds are in practical operation:—

1. *Railways*.—Whistles of locomotives, and explosives as fog-signals.

2. *At Sea*.—For merchant ships, the international regulations for preventing collisions at sea prescribe, as a compulsory requirement, that in fog, mist, or falling snow, whether by day or night, the signals described as follows, shall be used:—

(a.) A steamship, under way, shall make, with her steam-whistle, or other steam sound-signal, at intervals of not more than two minutes, a prolonged blast.

(b.) A sailing ship, under way, shall make, with her fog-horn, at intervals of not more than two minutes, when on the starboard-tack, one blast; when on the port-tack, two blasts in succession; and when with the wind abaft the beam, three blasts in succession.

(c.) A steamship and a sailing ship, when not under way, shall, at intervals of not more than two minutes, ring the bell.

And, as an optional proceeding, that a steamship, under way, may indicate her course to any other ship which she has in sight, by the following signals on her steam whistle, viz., one short blast to mean, "I am directing my course to starboard." Two short blasts to mean, "I am directing my course to port." Three short blasts to mean, "I am going full speed astern." A gun fired at intervals of about a minute is one of the authorised signals of distress at sea. In the Royal Navy the above regulations are also in force, but, in addition, Captain Colomb's system of sound-signalling is employed in fog, for the purpose of communicating between H.M. ships. Guns were formerly in use as fog-signals, but are seldom if ever employed now.

3. *The Army*.—The only sound signals systematically employed appear to be those made with the bugle.

4. *Coast Fog-Signals*.—By far the most important development of sound signals is in connection with the lighthouse and coast-

marking service. The most powerful lights are unavailing at night if enshrouded with fog, and, by day, buoys, beacons, and other marks and signs of the sea, are then rendered useless. The necessity for sound signals to do duty at such times for the obscured lights and hidden sea-marks, has brought about the development of a system of coast fog-signals, in which development, so far as the English coast is concerned, the Corporation which I have the honour to serve, aided by your distinguished chairman, Mr. James N. Douglass, the Trinity House engineer, and others, have had a large share. The Commissioners for Lighthouses in Scotland and Ireland, aided by their respective engineers, have also taken vigorous measures for guarding their coasts with fog-signals when necessary. It is proper, however, to observe that the lighthouse authorities in the United States took up the matter practically before it engaged much consideration in this country, owing to the east coast of America being in an exceptional degree liable to the visitation of fog, by which the coasting traffic was seriously inconvenienced; and the necessity arose for something to be done, whereby the difficulty might be obviated. The ready genius of the country was not long in coming to conclusions, and although some kinds of sound signals, such as bells, gongs, &c., were employed in Europe, the Americans first brought into use Brobdignagian trumpets, whistles, &c.

We will now pass on to consider the different kinds of instruments employed in connection with the various purposes to which I have referred.

Bells.—Bells, from the earliest times, have been employed to convey intimations by means of sound.

The present regulations for preventing collisions at sea require that, in fog, mist, or falling snow, "a steamship and a sailing ship, when not under way, shall, at intervals of not more than two minutes, ring the bell." These regulations are international, but the Turkish Government have objected to the use of bells as fog-signals on board Turkish vessels, on the ground that it is against their religion to use bells on board ship; and, therefore, in all cases where the regulations require a bell to be used, a drum will be substituted on board Turkish vessels.

As warning signals, bells have been employed from a very early date.

The notion of marking a hidden danger by a sounding bell was certainly in existence—if not practically applied—at a very early period. We know it was practically applied at Poolbeg, in Ireland, in 1811, and at the Bell Rock in Scotland, in 1812; and we also know that, up to the year 1860, bells were established, to be sounded in foggy weather, at many other lighthouses on the coasts of Great Britain and Ireland, and of France, the United States, and other countries, many of which continue to be sounded at the present day. These bells vary in weight from 3 cwt. to 45 cwt., and are generally struck by means of clockwork. In no case does the bell itself move, the clapper, or clappers, alone being actuated by the machinery. It is well known that the sound of a bell is curiously fluctuating. In the open country or at sea, in the neighbourhood of church bells, the sound may be heard rising and falling, the peal swelling out as if close at hand—now fading into the thinnest sound, as if retreating far, far away. These effects are familiar to most people, and in themselves are really beautiful; but they come into play injuriously when the sound is wanted to be evenly distributed over a certain area. The truth probably is, that the vibrations from the largest bell are not of sufficient intensity to yield a sound capable of overcoming opposing influences, even of a slight nature. The sound produced in the immediate vicinity of the bell seems, no doubt, exceedingly powerful, the greatest energy of vibration being there exerted; but, at moderately long distances, this apparent energy is dissipated, and the bell ceases to be of use. It will be easily understood that little dependence can be placed upon bells as trustworthy sound signals for long distances. The effective sound range of the largest bell is at all times very doubtful; the wind may carry it to a distance even of 10 or 12 miles, but against the wind it may be inaudible at less than a quarter of a mile.

In one form the bell continues to be serviceably employed, viz., when fixed on the top of a large buoy, with four hanging clappers around the outside of the bell, which alternately strike the bell as the buoy is moved from side to side by the action of the

waves. An incessant tolling is thus kept up; and at night, or in foggy weather, the signal is most useful to mark the turning points at the entrances to important ports, and at other places where the navigation is intricate, or to mark isolated dangers. The number of bell buoys round the British coast is considerable.

Gongs.—The next kind of sound-producer we have to notice is the gong. This instrument has been appropriated for use on board the light-vessels round the coasts, owing, probably, to its peculiar distinctive sound. The gongs used in the Trinity House service are about two feet in diameter, of Chinese make, and cost about £4 each. They are struck with a stick with a padded head, the strokes being very short, and delivered in quick succession, so as to bring up the gong into a vigorous state of vibration. The sound is undoubtedly distinctive, and serviceable at very short distances; but, like the sound of a bell, is soon dissipated after leaving the immediate vicinity of the instrument. Passing vessels may approach nearer to a lightship than to a rocky coast marked by a lighthouse; therefore, a sound with only a short range may oftentimes be of great service. In many lightships, however, the gong as a fog-signal is now superseded by instruments of very much greater power.

Guns and Explosive Signals.—Guns are used for various purposes in connection with signalling. "The minute gun at sea," indicates that some vessel is in distress, and that assistance is required. This is one of the authorised distress signals. On board H.M. ships, guns have been employed for signalling in foggy weather, in accordance with an arranged code; and for salutes and other announcements, they are used at military depôts and elsewhere. But their chief service has been as warning signals on headlands and dangerous points on a coast, to assist the mariner in foggy weather. The necessity for distinctiveness in the use of sound signals, and the loudness of the report yielded by the discharge of cannon, led to the adoption of this form of sound producer.

There is no doubt that these gun-signals have been of the greatest value. Many and many a time the warning gun has been heard by the bewildered seaman in time to enable him to alter his

course, and probably save his vessel. Formerly, the guns were fired every fifteen minutes, but recently, the interval has been altered to ten minutes. It would be difficult for two men to clean, load, and fire, for a lengthened period—say, even twelve hours—with less intervals than ten minutes between each discharge.

The piece of ordnance ordinarily employed was the old long 18-pounder, with a 3-lb charge of powder; but in the Trinity House experiments at the South Foreland, it was found that a short gun, the 24-lb. howitzer gave a better sound than the long 18-pounder.

Professor Tyndall thus sums up his opinion of the gun as a fog-signal:—

“The duration of the sound is so short, that, unless the observer is prepared beforehand, the sound, through lack of attention, rather than through its own powerlessness, is liable to be unheard. Its liability to be quenched by a local sound is so great, that it is sometimes obliterated by a puff of wind taking possession of the ears at the time of its arrival. Its liability to be quenched by an opposing wind, so as to be practically useless at a very short distance to windward, is very remarkable.”

Professor Tyndall continues — “Still, notwithstanding these drawbacks, I think the gun is entitled to rank as a first-class signal.”

In 1874-76, some experiments were made at Woolwich Arsenal, with the view of reducing the labour of firing, so as to enable two men to fire at more frequent intervals, and also to produce, if possible, a more effective report than had been obtained by discharges from guns of ordinary pattern. Colonel Eardley Maitland, of the Royal Gun Factories, Woolwich Arsenal, devised a form of gun, breechloading, with six chambers, similar, in some respects, to a revolver, and with a parabolic mouthpiece fitted to the muzzle. The experiments gave promise that this fog-signal gun would prove a success, and ultimately it was conveyed to the North Stack, near Holyhead, in order that it might have a practical trial. To reach the station, it was necessary to cross very bad mountain roads, and the gun received a severe jolting, and probably jarring, for it broke down shortly after being used. No further attempt was subsequently made to repair the

damaged gun, nor to manufacture another, owing to the attention of the Trinity House being then diverted to gun-cotton as an explosive sound-producer. It should also be mentioned that, in the trials at Woolwich, one experiment was devoted to testing the comparative advantages of the various kinds of service powder for noise-making purposes. The powders tested were—(1), F.G. (fine grain); (2), L.G. (large grain); (3), R.L.G. (rifle large grain); and (4) P. (pebble). In point of effectiveness in sound-producing, the result of the trial placed the powders exactly in the order in which I named them; the fine grain or most rapidly burning powder, giving undisputably the loudest sound; while the report of the slowly burning pebble powder was the weakest of all. The 80 and 100 ton guns, fired with charges of 300 and 400-lbs. of pebble powder, do not make anything like so terrible a noise as the enormous charge would lead one to expect. The sound seems to lack intensity; and, in comparison with the sharp smack of the detonation of gun-cotton, or of a much smaller charge of more rapidly burning powder, appears to be more of a prolonged and somewhat soft roar.

While upon the subject of guns, I must not omit to refer to the very ingenious invention of the gas gun by Mr. J. R. Wigham, of Dublin, the advantages claimed for which are that, where a supply of gas is available, the apparatus is very easily applied, and that the gun can be loaded and fired at a considerable distance from the point of explosion. The gun consists merely of a tube about 18 inches bore and 12 feet long, placed at the point where the signal is required to be made, and connected with a gas main or gas-holder, by iron piping. The gun is loaded with an explosive mixture of gas and atmospheric air, by turning on a cock simply, and is fired by a light applied by percussion or otherwise to the shore end of the tube, the explosion taking place at the mouth of the gun almost immediately. Mr. Wigham states that a gas gun may be fixed at the water's edge, or on a rock in the sea, at half a mile from the loading and firing station. The idea which is certainly one of originality, was conceived by Mr. Wigham when he was engaged in connection with the application of gas to the lighthouse at Howth Bailey, and his experiments at that station have met

with a very encouraging amount of success, but the system is not yet in practical operation as a fog-signal.

In 1874, the Trinity House obtained the consent of the War Department to some experiments being made at the Royal Arsenal, with the object of ascertaining the value of the sound produced by the explosion of varying quantities of gun-cotton. The explosion of gun-cotton takes place so instantaneously, that an exceedingly sudden and sharp blow is given to the surrounding air, whereby a sound wave of great initial intensity is generated. A number of comparative trials were made at Woolwich and elsewhere, in which the superiority of gun-cotton over gunpowder was incontestably demonstrated. During these experiments, the various charges of gun-cotton had been merely suspended from a horizontal bar, or in the focus of a large parabolic reflector, and fired by means of electricity. To explode gun-cotton, it is necessary to employ a detonator, consisting of a small cylindrical copper case, resembling an elongated percussion cap, containing a certain quantity of fulminate of mercury. This detonator is inserted in the heart of the portion of gun-cotton to be exploded, and an attachment is then made with one wire, connected with a small electric machine, and with another attached to a conducting-plate embedded in the earth. On turning the handle of the machine, a current is induced sufficiently strong to generate a spark at the connection of the wires with the detonator, which, coming in contact with the fulminate of mercury, immediately explodes it, and instantaneously the explosion is communicated to the gun-cotton. It will be readily understood that to discharge gun-cotton in this way entailed some little expenditure of time and trouble, and might prove inconvenient, if required to be repeated every ten minutes for many hours during fog.

But it being clearly demonstrated that the explosion of gun-cotton gave a very effective sound a project emanated from the Deputy-Master of the Trinity House (Admiral Sir Richard Collinson, K.C.B.), for making a rocket serviceable for carrying a charge of gun-cotton up to a certain height, and then causing it to explode. This project was, after numerous experiments, made a practical

success; and now, at five stations on our coasts, we have sound rockets, either substituted for guns previously used, or established *de novo* for signalling in foggy weather.

The explosive used is a slight modification of gun-cotton, called tonite, which is said to be cheaper than ordinary gun-cotton, and as effective for producing a loud report.

For purposes of safety, the rocket is supplied, and is kept, in three parts, viz.: (1) *The Rocket*; (2) *The Detonator*; (3) *The Tonite Cartridge*.

The fitting together of the three parts can be accomplished in less than a minute; the rocket is then lighted by applying an ordinary fusee to a piece of Bickford fuse, communicating with the rocket composition. The whole operation occupies less than two minutes. The cost of the rocket is about 1s. 5d., whereas each discharge of the gun costs 2s., and in foggy weather a rocket is sent up every ten minutes. The advantages gained by the introduction of the sound rocket are indisputable, in one particular more especially.

It frequently happens that the sound of a signal intended to be spread over an arc of, say, 180 degrees to seaward, is obstructed, or deflected, by intervening obstacles, so as to cause certain parts of the arc to be immersed in sound shadow, into which the sound penetrates with very feeble effect, and often not at all. This difficulty the rocket has surmounted most successfully.

The explosive charge is carried up to the height of about 600 feet, and is there caused to explode in free air. From the height at which the explosion takes place, the direct sound is sent downwards into places which would be completely hidden from the level at which a gun could be fired, and which would seldom be reached by the sound of its discharge. It should also be mentioned that the charge of the gun is 3lbs. of powder, and that the explosive charge of the rocket consisted of 4oz. of tonite.

The sound rocket is now in use at Flamborough Head, at Lundy Island, the Smalls Rock, in St. George's Channel, at Heligoland, and at the Tuskar Rock, on the south-east coast of Ireland. The system offers the means of placing an effective fog-signal at a rock lighthouse station, where limited space and accommodation would

prevent the establishment of a gun, or signal requiring furnace and machinery.

The development of explosive coast fog-signals has not gone beyond this point. Gun-cotton and cotton powder (or tonite) may be handled and stored with quite as much safety as gunpowder; in fact, they are really less dangerous; but it has not yet been shown that other explosive compounds, such as dynamite, litho-fracteur, blasting gelatine, or any other nitro-glycerine mixture, can be made practically serviceable. Some freeze at a temperature a little above 40° Fahr., and others do not lend themselves to manipulation, and to safe storing for lengthened periods. There is, however, every probability that further advances will be made.

One other form in which explosive signals are now used may here be mentioned. I have alluded to the gun fired at intervals of about a minute being the authorised signal of distress for ships at sea. Mr. Gardiner, of the Cotton Powder Company, has sent me particulars of a kind of signal which may be fired more easily, expeditiously, and effectively than the gun, thereby obviating loading every minute, an important consideration with a vessel in distress. This consists in a small charge of tonite made up into a sort of cartridge. When required to be used, one of these cartridges is dropped into a socket, and by pulling a lanyard attached to a friction tube, a small quantity of powder at the base of the signal is ignited, which blows the charge up into the air about 600 feet, where it explodes. At the moment of explosion some brilliant stars are also shot out, and thus the signal represents either a gun or a rocket, both distress signals. I am informed that many vessels have been supplied with these rocket signals, that their effectiveness is undoubted, and that the Board of Trade have sanctioned their use in lieu of either guns or rockets.

One further application of explosives requires attention. I allude to the use of exploding signals on railway lines, to convey signals to engine-drivers and guards in foggy weather, and to do duty for the semaphores and coloured light signals when they are obscured. The system is said to be fairly effective; there seems to be plenty of room for improvement; it is cumbrous, and admittedly expensive; and we may well hope that a more effective

and less objectionable method of signalling in fog may be devised for our railways.

Whistles.—The next instrument which claims our notice is the whistle. We will first regard it in connection with coast fog-signals. For this purpose, whistles, whether operated by steam or compressed air, do not appear to have found so much favour in this country as in the United States and Canada; indeed, with the exception of one station in the Clyde, where two small whistles, sounding different notes, are in operation, there are no fog-signal whistles on our coasts. In the United States they have been employed at various points since the year 1851. Steam whistles are simple enough in their arrangements, requiring only a boiler for generating steam, and a simple mechanical arrangement for opening a valve for the periodic passage of the steam to sound the whistle.

For air whistles, it is necessary to have some motive power to compress air, and also some mechanical arrangement to regulate the admission of the compressed air to sound the whistle.

In the Trinity House experiments of 1873-4, it was shown that the sound of the most powerful whistles, whether blown by steam or air, was generally inferior to the sound yielded by other instruments, and, consequently, no steps have been taken to extend their use in this country. Various reports have been circulated as to the great distance at which whistles have been heard on the American and Canadian coasts, but no such results as those claimed were obtained in the very careful trials, made with both American and Canadian whistles, at the South Foreland in 1873.

The sounding of a whistle is caused by the vibration of the column of air contained within the bell or dome, the vibration being set up by the impact of a current of steam, or air, at a high pressure. It is probable that the metal of the bell is likewise set in vibration, and gives to the sound its *timbre*, or quality. It is to be noted that the energy so excited expends its chief force in the immediate vicinity of its source, and may be, therefore, regarded as to some extent wasted. The sound of the whistle, moreover, is diffused equally on all sides. These characteristics, to some extent, explain the impotency of the sound to penetrate to great

distances. Difference in pitch is obtained by altering the distance between the steam orifice and rim of the dome; when brought close to each other—say within half an inch—the sound produced is very shrill, but it becomes deeper as the space between the rim and the steam or air orifice is increased.

The most recent adaptation of the whistle as a fog-signal is shown in an automatic signal-buoy, devised by Mr. J. M. Courtenay, of New York, by which a powerful whistle, fixed at the top of a buoy is sounded automatically by the action of the sea. The apparatus consists of a buoy, 12 feet in diameter, with a tube 33 inches in diameter, and 32 feet in length, passing vertically through the centre and descending below the bottom of the buoy to a depth of about 20 feet, the object of this length of tube being to reach a depth where the water is not subject to wave agitation. The bottom of the tube is open, and freely admits a column of water, which is maintained at a constant level and is not affected by the external superficial wave motion. The buoy, however, to which the tube is fixed, moves with the surface undulations of the water, and, of course, carries the tube up and down with it, thus establishing a piston and cylinder movement, the column of water in the tube forming a piston, and the tube itself being a moving cylinder, the weight of the buoy and the tube exercising a considerable pressure. By means of the motive power so established, air, which is admitted by stop-valves into that part of the tube which is above the level of the water, is compressed and forced through a pipe $2\frac{1}{2}$ inches in diameter, communicating with and sounding the whistle at the top.

One of these buoys has been practically tried off the Goodwin Sands for some months, and has proved a success; two more are about to be placed at other points. On the coasts of the United States, France, and Germany, they have also been in successful operation for several months.

Whistles are supposed to be the best medium for making signals by sound on board steamships. The regulations which I have previously quoted, specify the whistle for steamers; but it is necessary that precaution should be taken to ensure the whistles giving effective sounds. Frequently the condensed steam causes

so much water in the pipe, that when a sound-signal is required to be made in a hurry, only a rush of water comes through, without any effective sound.

On board the *Duke of Leinster* steamship, running between Glasgow and Dublin, a novel form of whistle, consisting of an organ pipe fitted on to the steam-pipe, is said to give very superior results. It is said that it does not get choked like ordinary whistles; and that the sound emitted is loud and resonant, without the shrill disquieting tone of many whistles. This instrument is patented by Messrs. Hannan and Buchanan, of Glasgow.

With regard to the use of whistles on locomotive engines, I have endeavoured to ascertain from sundry gentlemen connected with railway engineering, whether this kind of signal is the best for the purposes required, and from the replies I gather that the feeling is, "Well, it might be better, but it just answers." It does not appear that much is known by railway engineers about the construction or shape of whistles, and they seem to share the popular notion that the shriller the sound the more effective it is.

Fog-Horns.—The next class of instruments to which reference should be made is the horn, or trumpet, in which air or steam pressure is employed to set in vibration a metallic reed, or tongue, which vibration is communicated to air inside the trumpet, and also to the molecules of the metal of which the trumpet, or horn, is formed.

Mr. C. L. Daboll, of the United States, introduced, in 1851, an instrument of this kind to the notice of the United States' Light-house Board, and a trial was made at Beaver Tail point, Rhode Island. This instrument was sounded with air condensed by two air pumps, worked by a horse, the compressed air being stored in a receiver, and the trumpet sounded at a pressure of about 40 lbs. to the square inch. Ultimately, Mr. Daboll employed Ericcson's caloric engine as the motive power for condensing the air, and an automatic arrangement for regulating the blasts, and in 1862 he introduced his improved signal to the notice of the Trinity House Corporation, who gave it a practical trial at Dungeness. The results being very satisfactory, the Corporation placed other instruments of the same kind at several places round the coast, and one

was fitted up on board the Newarp light-ship. The experiments at South Foreland showed such instruments to be, under some conditions, very efficient, but they suffered from several disadvantages which have led probably to their disuse of late years. I have alluded to the fact of some of the initial power being wasted in the case of whistles, by the metal of the dome, or bell, being set in vibration; this occurs to a greater extent with the huge brass trumpets which have generally been associated with reeds. In a paper read before the Royal United Service Institution, in May, 1875, Admiral Sir Richard Collinson remarked that "the use of a trumpet consists chiefly in concentrating the sound into a beam, and thus causing it to be projected through the air with greater force in any required direction. The brass trumpet, no doubt, does this to a certain extent; but as the molecules of the metal are also set in vibration, sound waves appear to be generated from all parts of the external surface of the trumpet, so that, although a very loud sound may be produced in the immediate neighbourhood of the instrument, it is open to doubt whether that sound is transmitted with force to any great distance, its strength being, so to speak, dissipated in the space close to its source." The local noise occasioned by the vibration of the trumpet would be intolerable for any length of time. At the present time there are very few reed instruments with brass trumpets in operation, many of those originally established having been superseded by the siren, an instrument of which I shall speak presently. In connection with the development of reed horns very much is due to Professor F. H. Holmes, whose energy in connection with the electric light is well known. Under his immediate superintendence and advice two reed horns, sounded directly by steam, were fitted on board two light-vessels sent out to China, and have worked very satisfactorily.

Reed horns are also used on board ship, chiefly sailing vessels, in compliance with the compulsory fog-signals, and the optional sound signals, in connection with the "rule of the road" at sea.

Recently, there has been brought into this country, from the United States, an apparatus known as Barker's marine safety signal, intended for use on board ship, to make sound signals. The

apparatus has many merits, one of which is its simplicity in working, a second is that every signal is sounded automatically when once set; and a third is that, with the horn attached, it gives a very good sound. Compressed air is employed at a pressure of 6lb. to the square inch, and the sounding principle is a reed for the horn; but the inventor says, it can be equally well connected with the steamer's own whistle. The main object of the inventor appears to be to bring into use a short code of compass signals, by means of which vessels can indicate to one another their respective courses, the signal system consisting of eight combinations of long and short sounds. But it may be observed that the adoption of his code would make it necessary for the law to be altered, there being no permission or obligation to employ such signals in the rules now in force. And, again, the principle of long and short sounds which has been adopted does not commend itself for service at a moment when there is no time to lose in deciphering the meaning of a sound-signal from an approaching vessel. Captain Barker, however, has evidently had these considerations in his mind, for, in his descriptive pamphlet, he remarks that, though numbers of practical seamen consider the suggested code to be the simplest and best as yet brought forward, its adoption is by no means a *sine quâ non*, since the machine can, with equal facility, blow any code which may be decided on. Captain Barker would probably do well to adapt his machine to sound only those signals provided for in the regulations.

Sirens.—We now come to the instrument which has been authoritatively described as "beyond question the most powerful fog-signal which has hitherto been tried in England." In 1872, a Committee from the Trinity House, who went to the United States, witnessed the performance of an apparatus known as the siren, and patented by Messrs. Brown, of Progress Works, New York, and in the experiments at the South Foreland one of these instruments was sent over to be tried.

The instrument sent from America could be sounded either with steam or compressed air, made to pass through a fixed flat disc, fitted into the throat of a long trumpet, connected with the steam or air pipe. This disc has twelve radial slits, and behind it is a

rotating disc, with twelve similar slits, the rotation being effected by separate mechanism. Imagine, then, the pressure of steam or air to be on, with one disc fixed, and the other rotating; it will be understood that the slits in each frequently coincide—in fact the twelve slits in one revolution coincide twelve times, and at each coincidence a puff of steam or air, at great pressure, escapes through into the trumpet. It is the rapid succession of these puffs which form the sound of the siren. The disc is rotated so as to make 2,400 rotations in a minute; and as there are twelve coincidences in a revolution, it follows that the number of puffs passing through in a minute would be $2,400 \times 12 = 28,000$.

It can readily be understood that a sound of surpassing power is thus generated, and as the vibrations produced are not taken up by the cast iron trumpet, the sound issues from the mouth in a condensed beam of great intensity.

It is not of importance to record the longest distances at which the siren has been heard, the sound-range under different atmospherical conditions being so exceedingly variable; but in regard to its superiority over other instruments, we may say that under meteorological conditions unfavourable to the transmission of sound, the voice of the siren had a greater range than that of any other sound-producer; and that when local noises—such as those of wind in the ears, rattling of rigging, breaking waves, shore surf, paddle-wheels, and the working of engines—have to be contended with, "its density, quality, pitch, and penetration, render it dominant over such noises after all other signal-sounds have succumbed." It is obvious that this power to overcome obstructions is the true test of the value of a sound signal, and it is not surprising that the experience of the siren at the South Foreland should have led to the extensive adoption of this form of fog-signal on the coast of Great Britain. Since 1874, no less than 22 sirens have been placed at the most salient lighthouse stations on our coast, and 16 on board light-ships, moored in positions where a guiding signal is of the greatest service to the passing navigation. It should be added that, in the experiments, steam alone was used for sounding the siren; but the instruments now in operation on our coasts are sounded with compressed air, the motive power being caloric

engines of greatly improved design and construction, examples of which are in exclusive use at the Lizard, both for the electric lights and the fog-signal. Steam is not available at many light-house stations, owing to a scarcity of fresh water; and the calorific engine, which also rotates the siren disc, is regarded as safer and more economical in working than a high-pressure steam boiler, and is independent of water supply. In America, Canada, and some other countries, steam has been employed with considerable success.

At Howth Baily, a gas-engine is employed as a motor for compressing air for the siren now in operation there. This arrangement is due to Mr. J. Wigham, of Dublin, and is said to work very efficiently.

Messrs. Stevenson, of Edinburgh, have proposed that the Perkins engine should be employed as the motor for siren signals, but I am not aware that this suggestion has yet been carried out.

The adoption of the siren as the most efficient sound-signal for use in foggy weather, may be regarded as an important epoch in the history of the development of the use of such signals. Improvements have been made by Mr. James N. Douglass, engineer to the Trinity House; and Mr. Slight, superintendent to the Trinity House workshops, has invented an improved arrangement by which, instead of flat discs being used, the siren consists of two concentric cylinders, with slits in both, one inside the other, the outer one being fixed, and the inner one revolving, with the smallest possible clearance between them. The advantages of this arrangement are, that the suddenness of letting on or taking off the pressure is much increased, whereby the successive blows upon the air are rendered much sharper, and the sound intensity augmented. It is also considered an improvement mechanically, by somewhat lessening the friction; Professor F. H. Holmes has succeeded in rendering the rotation of this siren cylinder automatic, with perfect control of the speed and consequent pitch, and an apparatus of this kind has not long since been fitted on board the light-ship at the Seven-stones.

It seems probable that before long the siren will be brought into more general use for maritime purposes. Already it has been

introduced into the Royal Navy, for which service Professor Holmes has supplied three small-sized instruments for ships, and, in a smaller form, for locomotives, in the place of the whistle. Mr. Wigham, of Dublin, has also designed a form of siren for steamships, driven by a small turbine, actuated by the current of steam or air by which the instrument is sounded, the rate of rotation being controlled and rendered uniform by a simple governor.

It now remains to offer a few general remarks upon the subject.

It is obvious that, with the increasing use of sound-signals, there is an increasing necessity for differentiating them. Something must be done to prevent one from being mistaken for the other; in fact, it is necessary that every signal should have its own characteristic. This essential element, as regards coast fog-signals, has by no means been overlooked, and as each lighthouse is made to proclaim its own individuality, so every fog-signal established on our coast has been made to particularly indicate itself by some distinguishing feature. One great reason why explosive reports, whether from guns or rockets, are made use of, is because their sound is so entirely different from that of the blast of a siren, a reed horn, or a whistle. Indeed, the three latter strongly resemble each other, and can only be distinguished by trained ears. It has also been found useless to attempt to get differential signals by means of pitch of the note alone. To employ a high note at one station, and a low note at another, would, in the present condition of the musical cultivation of mariners generally, be more likely to lead to confusion and disaster; although, as Sir Richard Collinson observed, in 1875, it might be possible to obtain an effective distinction by sounding a high and a low note in direct contrast. It has been frequently proposed to introduce long and short blasts; but here, again, experience has shown that many difficulties and risks would attend such an arrangement, and might result in conveying wrong information to the mariner, and lead him into danger. For real practical utility it has been found that, for the present, it is best to trust to the distinctions which may be obtained by varying the number of blasts, and the length of the silent interval. This is a system

which is intelligible to the most ordinary understanding; and, accordingly, it is on this basis that the characteristics of sound-signals are founded. By making the blasts to occur in groups, and varying the length of the intervals between the groups, on the same principle as that now applied to the new class of group-flashing lights, sixteen fundamental distinctions may readily be obtained, thus—commencing with an interval of half a minute:—

1 blast every $\frac{1}{2}$ minute	3 blasts every $\frac{1}{2}$ minute
“ “ 1 “	“ “ 1 “
“ “ 2 minutes	“ “ 2 minutes
“ “ 3 “	“ “ 3 “
2 blasts every $\frac{1}{2}$ minute	4 blasts every $\frac{1}{2}$ minute
“ “ 1 “	“ “ 1 “
“ “ 2 minutes	“ “ 2 minutes
“ “ 3 “	“ “ 3 “

The introduction of compulsory and optional sound-signals in the new regulations for preventing collisions at sea, has naturally much extended the use of sound-signals on board ship, and there can be no doubt that such signals should be entirely different from those made at fixed fog-signal stations. It is said that already some difficulty has arisen in reference to the clause in the regulations, which enacts that in foggy weather a steamer shall sound a prolonged blast at intervals of not less than two minutes, the fact being that several coast fog-sirens sound the blast every two minutes. Unless checked, this, perhaps, is a danger likely to go on increasing as ships' sound-signals become more powerful and more generally used.

I may remark it is not easy to see how the system of long and short sounds can at present be brought into satisfactory operation. Such distinctions are extremely pretty and simple upon paper, but they assume a vastly different aspect in the mind of an anxious mariner, on board his vessel, say in the Downs, in a thick fog. All around he hears horns and whistles blowing, and all he attempts to do is to keep clear of those vessels which, by the sounds, appear to be nearest. Of what use, then, would be the combinations of long and short sounds? Would he, in his bewildered state, care to try to distinguish between them? I

venture to say he would have neither the time nor the inclination to do so ; and it must not be forgotten that, in making provisions of this kind, it is not the skilled, clear-headed, highly-educated, Royal Naval or merchant captain you have to consider, so much as the thousands of experienced, weather-beaten master mariners, who know well how to navigate their vessels under trying circumstances, but whose minds are not adapted for comprehending any system requiring accurate and attentive observation, to which is tacked on the necessity of finding out the meaning after the observation is made.

As regards the present development of our coast fog-signals, there is every reason for congratulation. This new branch of coast marking has been brought up to a very effective condition ; no efforts have been spared to cope with the seaman's greatest enemy, fog, and the foregoing remarks indicate with what success these efforts have been attended. By the aid of sound signals, the mariner is now enabled to continue his voyage with comparative safety, even when his vessel is enshrouded with a thick pall impenetrable by the keenest vision ; and there is little doubt that those who have their business in the great waters are ready gratefully to acknowledge the humane spirit which has prompted the development of these signals, as well as the practical benefit which they derive from them.

GRAIN CARGOES.



AS the "Merchant Shipping (Carriage of Grain) Act, 1880,"* comes into operation on the 1st January, 1881, it may be useful to our readers to be reminded of its main features and of the steps which have, up to the present time, been taken by the authorities respecting it.

In the first place, to come within the provisions of the Act at

* Printed *in extenso* in our October number.

all, or, in other words, to be regarded as "a ship loaded with a grain cargo," a vessel must load a cargo of which more than one-third consists of grain. Thus, for every 100 tons of her net registered tonnage, a ship may carry either 66 tons weight of grain, or she may have $\frac{1}{3}$ ths of her space filled with grain, and go altogether free from the operation of the Act. Again, the Act does not apply to a ship unless she is laden with grain at a port in the Mediterranean or Black Sea, and is bound to a port outside Gibraltar, or unless she is laden at a port on the Coast of North America.

As regards ships coming under the Act, the principle of the measure seems to be to give as much latitude as possible as regards the means to be taken for the safe stowage of their grain cargoes, and to this end, the Board of Trade have extensively distributed an "Official Notice," which will be found in our advertising columns, and is to the effect that ships loaded with grain at ports on the coast of North America, in accordance with certain Regulations in force there, and which have been approved by the Board of Trade, subject to the additional provisions contained in the Second Schedule of the "Notice" to which we have referred, will not be required to adopt the precise precautions prescribed by the Act.

Inasmuch as no Rules applicable to ships loading grain at ports in the Mediteranean or Black Sea seem to have been approved by the Board of Trade, we conclude that at such ports the actual precautions prescribed by the Act must be adhered to.

The Board of Trade have, besides, largely distributed, both in this country and abroad, a pamphlet containing the various Rules they have conditionally approved, and also copies of a form to be used by masters in making the statement required to be delivered (at the final port of loading, and at the port of arrival in the United Kingdom) to the British Consular officer or to the principal officer of Customs, as the case may be. Copies of this form and of the pamphlet of Rules can, we understand, be obtained in this country of the superintendents of Mercantile Marine at the various ports, and at grain ports abroad, of the Consular officers.

It will, therefore, be understood that if a ship is "loaded with a

grain cargo," within the meaning of the Act, at a port on the coast of North America, she must either be—

(a.) Loaded in accordance with some local Rules which have been approved by the Board of Trade, provided always—

1. That shifting boards must extend to the keelson.

2. That there shall not be carried between the decks, or if the ship has more than two decks, between the main and upper decks, any grain in bulk, except such as may be necessary for feeding the cargo in the hold, and is carried in properly constructed feeders.

3. That grain carried in bulk must be supplied by proper feeders, or else secured by bags of grain or other cargo :

(b.) Or she must be loaded in accordance with the provisions of the Act.

If she loads grain in the Mediterranean or Black Sea she must be loaded in accordance with the provisions of the Act, which, we may remark, requires that all reasonable precautions (whether prescribed in the Act or not) shall be taken in order to prevent the grain from shifting.

THE NEW REGULATIONS FOR PREVENTING COLLISIONS AT SEA.

To the Editor of the "Nautical Magazine."

IR.—It is much to be regretted that, in framing the above rules and regulations, any point should have been so worded as to leave an uncertain sound. On Art. 5 of these rules, opinions have been much divided as to whether it applied to telegraph vessels only, or included all ships which, from any accident, were not under command. I am now informed that the Board of Trade has stated in reply to an inquiry on this head, *that all sea-going vessels not under command are required to show the lights and shapes mentioned in Article 5.*

Now, without prejudice to the opinion expressed by the Board of Trade, which Board seldom commits itself to an opinion without

due consideration, it may be well to view the question from different standpoints, not alone to find what the framers of the Article meant, but to ascertain, if possible, the construction to be given to the wording of the Article in a court of law.

The Article states—

"A ship, whether a steamship or a sailing-ship, when employed either in laying or in picking up a telegraph cable, or which from any accident is not under command shall, at night, carry [in the same position as the white light which steamships are required to carry; and if a steamship in place of that light] three red lights in globular lanterns, each not less than ten inches in diameter in a vertical line, one over the other, not less than three feet apart, and shall by day carry in a vertical line, one over the other, not less than three feet apart in front of, but not lower than her foremast-head, three black balls or shapes, each two feet in diameter.

"These shapes and lights are to be taken by approaching ships as signals that the ship using them is not under command and therefore cannot get out of the way.

"The above ships when not making any way through the water shall not carry the side lights, but when making way shall carry them."

Now, if in reading the first clause we leave out the words I have above placed within brackets, which have only reference to the position of the lights to be carried, we shall have a reading as follows:—

"A ship, whether a steamship or a sailing ship, when employed either in laying or picking up a telegraph cable, or which from any accident is not under command, shall at night carry three red lights in globular lanterns, &c., &c." Now, as the employment of the steamship or sailing ship is defined as laying or picking up a telegraph cable, the words "or which from any accident, &c.," must have reference to the above vessels alone; had the meaning been otherwise, the words "or any other ship" which from any accident, &c., would have been used.

Again, I think we have further proof of the meaning of this Article, in the fact that with the exception of telegraph ships, all other craft are provided with distinguishing lights, and as the

telegraph ship, like the tramcar on rails, is confined in action, a distinct signal was necessary to denote such vessel, consequently we have these three red lights and shapes.

If further proof were wanting I think it will be found in the last clause of this Article.

"The above ships, when making way through the water, shall not carry the side lights, but when making way shall carry them."

This appears to point clearly to the three red lights as the regulation lights for "particular vessels," and not lights for all vessels under particular circumstances, for here the red lights are to be carried with the "side lights" when making way, and as all vessels, not attached to a telegraph cable or similar hindrance when making way, are supposed to be under command, and are provided with and are required to carry their regulation lights, the three red lights cannot be supposed for these, and, therefore, must refer to telegraph ships alone. Were it otherwise, what amount of way could be given suitable for all vessels alike affected by accident, for hauling these red lights down and appearing in their own distinctive character. Sailing-ship, steamer, tug-boat, pilot-boat, fishing-boat, or vessel in distress, each and all of these have their distinguishing lights, and a single bright light is understood by seamen to represent a vessel at anchor, or otherwise stationary, or being overtaken, and consequently to be kept clear of.

There is also another reading of this Article which would lead to the inference that the "three red lights" were not intended to be carried by sailing-ships. The words are, "and if a steamship in place of that light (meaning her mast-head light), three red lights," &c., &c. True, the sailing-ship, unlike the steamship, has no mast-head light to displace, but lights, if to be hoisted in the position named in a sailing-ship dependent upon her sails for making way, would be most inconvenient, and visible only from a very limited arc of the compass.

Before closing another point may be named, from the shipowner's point of view. With distinguishing signals prescribed for all necessary purposes, he may fail to see any advantage to be gained by this

new requisition if extended to all sea-going vessels not under command; most small craft will find it necessary to enlarge their cabins to secure a place of safety for three globular lamps ten inches in diameter, and three black balls or shapes two feet in diameter, and may well have doubts as to whether when required they would be in fit repair for the purpose required. They would seldom be required by sailing vessels unless introduced as a signal to distinguish "when hove to" under storm sails in a gale of wind. To steamships, and especially in our own ocean steamship companies, they might with advantage be introduced to indicate repairable damage to machinery as distinct from ship in distress.

J. S.

PHYSICAL EXAMINATION OF PILOTS AND SEAMEN IN THE UNITED STATES.

(From the Annual Report for 1880, of the Supervising Surgeon-General of the Marine Hospital Service of the United States.)

THE passage of a law requiring the compulsory physical examination of seamen of the merchant marine is again recommended as a measure in the true interest of American commerce; and the dictates of humanity demand for the greater safety of the travelling public, that persons suffering from colour blindness be no longer allowed to jeopardise the lives of passengers upon our vessels. The Treasury Department has done all that could be done in the matter without additional legislation. The Circular of this office of June, 1879, allowed gratuitous examinations by the officers of this service of such persons as chose to avail themselves of the privilege, and the Board of Supervising Inspectors of Steam-Vessels passed a rule requiring that no original license shall be issued to a pilot until a certificate has been produced showing the applicant to be free from colour blindness, and that no license shall be renewed until the pilot shall have been examined. In case the pilot is completely

colour blind, the license is refused; but, in case the colour blindness is "incomplete," a test with signal lights is allowed at the discretion of the local inspector. No notice has been taken of acquired or temporary colour blindness, from accident or disease, occurring subsequent to the examination.

The rule is as follows, and it has been enforced by the Supervising Inspector-General, who has taken a warm interest in the protection of the travelling public from the liability of the occurrence of accidents from this cause:—

Rule 47. Inspectors, before granting or renewing a license to any person to act as a pilot, shall satisfy themselves by examination that he can properly distinguish the coloured lights used as signals on steam vessels,* and that he thoroughly understand the Rules and Regulations governing pilots.

The following is a copy of the Department Circular on this subject:—

Treasury Department, February 17, 1880.

By an amendment to Rule 47, Rules and Regulations of the Board of Supervising Inspectors, adopted at the twenty-eighth session of the board, recently held in this city, and which was approved by the Secretary of the Treasury, February 13, 1880, and promulgated in Department Circular, No. 13, 1880, it was ordered that all persons applying for either a renewal of license, or an original license, as pilots on steam-vessels, shall be required to undergo a visual examination, in order that it may be determined whether such person can properly distinguish the coloured lights used as signals on steam-vessels; and, in future, inspectors will issue pilots' licenses only upon certificates of surgeons of the United States Marine Hospital Service that applicants therefore fulfil all the requirements of the rule referred to.

Under the provisions of Department Circular of June 11, 1879, surgeons of the Marine Hospital Service are directed to make such examinations free of expense to persons applying therefor.

Inspectors will furnish to each applicant for pilot's license a

* See Department Circular, No. 14, February 17, 1880, for instructions as to the method for carrying out this amendment.

copy of blank form No. 2153, signed by themselves, and addressed to the surgeon of the marine hospital nearest to the residence of the applicant, unless there should be an officer of that service at the home port of the local inspectors. Said blank form must be returned to the inspectors by the examining-surgeon with his official report thereon. When such report is favourable, other requirements being complied with, a license may be issued, the report to be retained upon the files of the inspector's office.

Inspectors will forward to the Supervising Inspector-General monthly reports of the number of all applicants for pilots' licenses, stating separately the number who pass examination, and of those who are rejected on account of defective vision.

The following list includes names and stations of surgeons, assistant-surgeons, and acting assistant-surgeons of the Marine Hospital Service, to whom applicants for pilots' licenses may be referred for examination.

JOHN SHERMAN, Secretary.

TO SUPERVISING AND LOCAL INSPECTORS OF STEAM-VESSELS.

1880.
Department No. 19.
Steamboat Inspection.

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Treasury Department,
Washington, D. C., March 9, 1880.

In view of the expense and hardship likely to accrue to pilots living at points remote from stations of the Marine Hospital Service, in visiting such stations for the purpose of being examined as to colour blindness, as required by the amendment to Rule 47, Rules and Regulations of the Board of Supervising Inspectors, Department Circular No. 14, dated February 17, 1880, is hereby modified as to allow pilots employed at places remote from a marine hospital station to be examined by any respectable resident physician, whose certificate that such pilot is exempt from the disease known as colour blindness shall accompany the license and oath of office of such officer when sent to any board of local inspectors for renewal of his license in the manner provided in Rule 42, Rules and Regulations. Upon the receipt of the certificate a license shall be issued the same as though said examination had been made by a marine hospital surgeon. This modification is not to be applied to applicants for original licenses; they, in all

cases, must be examined in the manner provided in Circular No. 14.

A second visual examination will not be required in any case, and inspectors will therefore retain all certificates upon their permanent files for reference in cases of applications for renewal of licenses.

JOHN SHERMAN, Secretary.

TO SUPERVISING AND LOCAL INSPECTORS OF STEAM-VESSELS.

1880.
Department No. 25.
Steamboat Inspection.

} Treasury Department,
Washington, D. C., March 19, 1880.

In view of the fact that only one examination for colour blindness, as required by Department Circular No. 14, February 17, 1880, will be necessary in any case, supervising and local inspectors are hereby informed that the Department deems it advisable that the evidence of such examination should appear upon the license each pilot receives at the time of the examination, and they are ordered to endorse upon the back of every such license henceforth issued the following form :

Passed examination for colour blindness ———, 188—.
Surgeon's certificate on file in the office of U. S. local inspectors
at ———, as per endorsement upon surrendered license No. ———.

——— ———,
——— ———,

U. S. Local Inspectors of Steam-vessels,
District of ———.

Where this endorsement is original the blank space for the number of surrendered license must not be filled.

This arrangement is designed to prevent annoyance to pilots who may be compelled to renew their licenses in districts other than those in which they were examined and in which the record of the examination is kept. * * * * *

It is not to be supposed that these rules, so radical in their operation, went into effect without opposition. Up to June 30, 1880, 2,870 pilots were examined, and 64 found to be colour blind. All those rejected and thrown out of employment were, of course, bitterly inimical to the system of examinations, and

their sympathizing friends made numerous appeals to the Supervising Inspector-General in their behalf.*

The Department subsequently modified the rules, so far as to allow re-examinations with signal-lights, of such persons as had been reported by the surgeon as "incompletely" colour blind.

PILOTS INCOMPLETELY COLOUR BLIND.

1880.
Department No. 46.
Steamboat Inspection.

}

Treasury Department,
Washington, D. C., May 20, 1880.

Local inspectors of steam-vessels are hereby authorised to examine with the coloured signal lights all pilots applying for renewal of license, who have been reported by the examining surgeon as only *incompletely* colour blind, and if the inspectors are satisfied, after such examination, that said pilots can sufficiently distinguish the coloured signal lights used on steam-vessels, it will be within their discretion to renew the licenses.

Local inspectors will report in detail to the Supervising Inspector-General of Steam-vessels all examinations made under the provisions of this Circular, and accompany their reports with copies of the examining surgeon's reports.

Local inspectors will make requisitions upon the Department for authority to purchase the signal lanterns necessary for the above-mentioned examinations, stating the cost of the same in their requisitions.

JOHN SHERMAN, Secretary.

* The following endorsement was put upon one of these applications, having reference to an old pilot of many years' standing, who had been found upon examination by the surgeon to be "green-blind." * * * *
"Evidence showing that this applicant is able to detect a 'difference' between green and red, should not, in my opinion, entitle him to a certificate, as the fact that such applicant is 'green-blind' remains. I should therefore recommend the rejection of such applicant, the period of his previous service having little, if any, bearing on his visual capacity, the sole and only object of the examination. Although this may work a hardship in individual cases, the determination of the visual capacity of the pilot is one in which the lives of vast numbers of people depend, and the immediate effects of a rejection on particular individuals ought not, in my opinion, to be considered."

But it is at sea where a perfect colour sense is of the utmost importance to executive officers and look-outs. It is stated in a recent article* on the subject of collisions at sea, that their number is constantly increasing.

"The British Board of Trade furnishes the following table of collisions off the English coast alone :—

In 1852 there were	57 collisions.	
In 1853	73	"
In 1854	94	"
In 1855	296	" (49 vessels sunk).
In 1856	307	"
In 1859	323	"
In 1860	298	"
In 1861	349	"
In 1864	351	" (263 at night).
In 1865	354	" (240 at night).
In 1866	368	"
In 1867	414	" (286 at night).
In 1868	379	"
In 1869	372	"

"According to the English Lloyd's report, the average annual number of collisions throughout the world during the years 1866 to 1871, was 2,163, resulting in the sinking of 175 vessels. This number only includes those that were insured, and also necessarily excludes a great many whose cases were settled without litigation. Perhaps 2,300 would be nearer the mark.

* * * * *

"Daltonism, or colour blindness, being a not infrequent physical defect, is cited as an argument against the use of coloured position lights, as *any man of the crew is liable to look-out duty at night.*† A French doctor, M. Favré, examined 1,050 men, aged from 18 to 30, and found 98 more or less affected by this peculiarity of vision. In England, at a meeting of the Royal

* "Collisions at Sea," by Lieut. SEATON SCHROEDER, U. S. N., in the *United Service* for August, 1880.

† The *Italics* are mine.—J. B. H.

United Service Institution in 1875, Mr. Stirling Lacon announced that experiments carried on in Edinburgh by Mr. George Wilson showed that about 1 person in 17 had defective sight, and that 1 in 55 could not distinguish green from red. These two complementary colours, which are the most often confounded, are the very ones used in Coston signals, in the sectors thrown from lighthouses, and in the side-lights of vessels. M. F  ris, a surgeon in the French Navy, examined 501 men of between 17 and 50 years of age, principally seafaring people, and found 13 almost perfectly colour blind, and 11 others that could distinguish tolerably well the simple colours, but made the most peculiar mistakes in their combinations, mistaking rose for violet and yellow, yellowish orange for red, &c. There were also 23 others from among the 501 that hesitated constantly in defining the various colours. A total, therefore, of 47 men, or 9.4 per cent. of all he examined, were thus affected to a greater or less degree.

"Persons troubled in this way, however, are not fitted for active sea duties, and have no business on board ship. Here again, though, we see the disadvantage under which merchant captains labour; *their crews are not subjected to such physical examinations as are the recruits for the naval service*, and it may well happen that one of their look-outs cannot distinguish between red and green. It must be remembered that very much the greater number of vessels met with at sea belong to and are equipped by private parties, and rules and regulations should be framed with due regard to their frequent inferiority in *mat  riel* and *personnel*.

"Unfortunately, too, this peculiar defect, although most often originating in birth, may be brought about by various causes, such as bruises on the head, typhoid fever, or similar diseases, excessive use of tobacco and alcohol, to all of which seamen are particularly liable (especially the first and the last). M. Fav  re, among numerous examples, cites the case of an engineer, to whom in consequence of a bruise on the eye, red appeared yellowish gray; yellow, orange; green, black; blue, grey; violet, greyish. Another railway employ  , after a similar accident, mistook a twenty franc gold piece for a silver franc, and a silver piece for a

copper sou. He suggests that examinations for this defect should be made whenever practicable after the infliction of a bruise on the head or after a severe illness, and frequently on those that indulge freely in tobacco or liquor."

The Holmgren method of testing for colour blindness, by worsteds, has been adopted, and it has proven fairly satisfactory, as far as any test can, that detects the defect in question. No test will be satisfactory to those persons who fail to pass. Several persons (applicants for renewal of license) who were found by the examining surgeon to be green blind, but capable of distinguishing other colours, were afterwards examined with signal lights, by the local inspectors, and furnished certificates. The examination by signal lights would doubtless be more satisfactory if the coloured glasses were of uniform shades of colour, and if a greater number of colours were used in making the test, but unfortunately, as usually conducted, it affords but little guarantee that the applicant can make the distinction between colours, for when two lights, red and green, are shown him, if he knows one colour he is certain to guess the name of the other, and it usually happens that another sceptic is scored against the Holmgren method. The lack of a uniform standard of colour for lantern glasses, and neglect to properly cleanse them, is alleged by experts to be an additional reason why the colour sense should be acute and not feeble.

* * * * *

* "There is much fault found with vessels' lights at sea otherwise than from defects in the system. It often happens that the boxes are so placed that either light may be seen from off the other bow. This may result from the screens being too short, or from the centre of the light being too far from the screen. A rigid inspection previous to sailing would put an end to that difficulty.

"It is also very seldom that the lights are visible as far as is called for by the law—five miles for the mast-head, two miles for the others. This may arise from the use of an inferior illuminating material, from want of trimming the wicks, or from lack of care in cleaning the glasses. In naval vessels none of these causes

* Lieutenant Schroeder, U. S. A., in *United Service*, *op. cit.*

are very likely to exist; the best of oil is generally furnished, and in the organization of a man-of-war the specified duty of each one of the crew renders the lack of care unlikely and unpardonable. Not so, however, with our friends in the Merchant Marine, where men are so scarce on deck, and where it may often happen that a cheaper oil is furnished, and even that perhaps in insufficient quantity. The dimness of a light not only prevents its being seen so far, but often makes it difficult to distinguish the colour, not any too well defined at any time. How often is the reply heard, 'Can't make it out, sir,' to the question, 'What colour?' To all this, of course, there is no absolute remedy. We cannot expect everything to work as well under all circumstances at sea as in a testing-room on shore. The law should enforce the use of such illuminating material as is found to give the most brilliant light, if suitable in other respects. Petroleum is suggested.*

When signal-lights are proposed as tests for colour-blindness in opposition to the united opinions of the best informed ophthalmologists in Europe and America, it seems to be assumed that the medical examiner has a peculiar and special interest in the rejection of the candidate.

This assumption needs no refutation.*

Colour-blindness seems to be the only physical defect in which the public take a sufficient interest, although it would appear that

* The following Associated Press dispatch, published just as this report is ready for the printer, is republished as showing the fallacy of flags as a test for the determination of the acuteness of the colour perception:—

"EXPERIMENTAL TESTS ON THE ILLINOIS CENTRAL RAILWAY.

"Chicago, September 10.

"John E. Owens, superintending surgeon of the Illinois Central Railroad, has made a report to Mr. Jeffery, superintendent, covering the general subject of examinations for colour-blindness and visual power, by means of red and green flags, red and green lanterns, and different-coloured worsteds. He urges Mr. Jeffery not to encourage the employment of flags and lanterns for the detection of colour-blindness. The case of an employé of the Illinois Central, examined at Amboy, Ill., who was found colour-blind by Holmgren's worsteds, is cited in the report as being of particular interest. Mr. W. K. Head, personal-injury agent, suggested the flag test after they had used the worsteds. Being interested to see the result, he encouraged a second exami-

persons incurably deaf, or suffering from various affections, such as hernia or heart disease, have certainly equal claims to attention. No less than 4 pilots died at the wheel, presumably from heart disease during the past year, and the only action yet taken has been the requirement that on all steam-vessels of the United States there shall be two persons at the wheel. It is proper to remark that while the Department can enforce certain "pilot-rules" on steam-vessels, it has no such power over sailing craft, nor over other persons than pilots or masters—a very limited class of seafaring men. Attention is invited to the medical statistics printed elsewhere, showing the very large number of persons suffering from diseases which entirely unfit them for active seafaring pursuits. Thus, since 1873, there have been treated by this Service 2,731 cases of phthisis pulmonalis, 641 of heart disease, 136 of varicose veins, 98 of aneurism, 2,752 of ulcers of the leg, 5,800 of secondary syphilis (estimated), 482 of Bright's disease, 30 of cataract, 314 of hernia, 1,335 of stricture of the urethra, 62 of chronic insane, 133 of epilepsy, making a total of 14,468 persons physically incapacitated for seafaring pursuits, and represents an almost incalculable loss to the maritime interests. A large proportion of those suffering from these diseases were again shipped on board American vessels by persons to whom the "blood-money" of a helpless invalid or imbecile was quite as valuable as that ob-

nation, and stood near the person examined in order to hear his answers. The day was dark and rainy. They used a building about ninety feet in length. The result of the examination is thus given by Dr. Owens:—

"Mr. Head, having secured two clean, new flags, red and green, stood at one end of the building, opposite to an open door or window, in such manner as to be unseen by the examined. Mr. Jacobs, division superintendent; Mr. Adams, master of machinery; Dr. Travers, myself, and several others, together with the employé being examined, stood at the other end of the building. Mr. Jacobs conducted the examination. When the flags were exposed I noticed that the light from the window or door fell directly upon them, and thus rendered the colours bright. The man answered correctly for a time, as the flags were exposed, and I think we would all have been willing to have stopped the examination, and to have reported him normal as to colour perception, so far as the test by flags was concerned. The examination, however, was continued, and finally the examined person

tainable from a sound and healthful seaman. The charge of filling our ships with unsound and unseaworthy crews must, therefore, be laid at the door of the "blood-money" payers and receivers. Vessel-owners and masters, while aware of the existence of the necessary machinery in this Service for the successful weeding out of these commercial burdens, are yet unable to avail themselves of the facilities offered by the Treasury Department, on account of their inability to control the method of shipment of the men.

Nothing short of a compulsory examination, under proper legal restrictions, will afford a satisfactory remedy. Legislation for the compulsory physical examination of seamen has been recommended by various shipping organizations, among whom may be mentioned several of the principal United States shipping commissioners, the Philadelphia Board of Trade, the Shipowners' Association, the National Board of Steam Navigation, the Maritime Exchange of Philadelphia, &c.

COLOUR BLINDNESS IN PILOTS.—An interesting question has been raised by one of the San Francisco Pilot Commissioners regarding colour blindness or defect of vision in pilots. This gentleman offered to the Board of Commissioners a resolution requiring all applicants for a renewal of license as pilots to pass an examination for colour blindness. The resolution was adopted

said, rather hesitatingly, as the green flag was held out to him, 'I should call that green.' 'You say "should"?' answered Mr. Jacobs; 'ain't you certain of it?' 'Well, yes, (rather hesitatingly) I should call it green.'

"At this second stage the examination might well have rested, with a result in favour of the examined. I take it that a less critical non-medical examiner than Mr. Jacobs might not have given due appreciation to the word 'should' in the answer noted.

"I at once said to the examined: 'Could you swear that that is green?'

"'Oh, no,' said he; 'I could not swear to it.'

"This answer surprised us all.

"Mr. Head then went outside the building, about 400 feet away, and held up a bright red flag, there being in the immediate background a tree in rich foliage. This he called a green flag. This case certainly brings us to one conclusion at least, viz.: The danger and uncertainty of the flag test."

by the Board of Commissioners, but it created much feeling among the pilots. Those who expect a renewal of their licenses seem to think that some injustice might be done them under a strict enforcement of this rule. With regard to the good sense of this resolution there can be but one opinion. Every man engaged as a pilot should possess good vision and the ability to distinguish colours. The important part which distinguishing colours play in navigation and on railways, leaves only one safe rule to be followed. Those who are defective in vision are unfitted to be employed in such work. This rule has not been enforced until lately, and therefore its provisions may seem harsh, but the safety of the public leaves no other alternative. The course of the San Francisco Commissioners in this matter will therefore be watched with interest. We believe that one of the rules among most of the Boards of Pilot Commissioners in this country requires that an applicant for a pilot's licence shall be able to distinguish the colours, red, green, and white from each other.—*New York Maritime Register*.

CORRESPONDENCE.

NAUTICAL ASSESSORS.

To the Editor of the "Nautical Magazine."

SIR,—The Mercantile Marine of this country, as represented by shipowners, masters, officers, and seamen, should be greatly indebted to you for your very able and sensible protest (contained in this month's *Nautical Magazine*), against the paper recently presented to Parliament, purporting to be an expression of public (?) feeling against the practical exclusion of Naval officers from sitting as Assessors on Courts of Inquiry into merchant shipping accidents. The letter of your correspondent "A British Shipmaster," is also to the point, and his moderation is commendable, for in very truth the rushing into the controversies of this question of the men who are to act as judges on these Courts is a sorry sight, and one calculated to rouse all the angry feelings engendered by years of tamely endured injustice. For

years and years the shipowners and officers of the merchant service tamely submitted to these Courts of Inquiry, presided over by stipendiary magistrates and justices of the peace, whose decisions (often untenable from a nautical point of view) were prompted by the Naval officers, who sat as Assessors, and who were totally unacquainted with the duties and exigencies of the merchant service. This was ever felt to be a gross injustice, but for a long time no united front was shown against it, the forbearance exercised by masters and officers being simply suicidal. Truly forbearance is a virtue, but when carried too far it degenerates into an infatuation, and so at last a firm stand was made, which, after a great many years of untold labour and expense, resulted successfully. Last year we got the Shipping Casualties Investigation Act, which gives us the right of appeal in cases of suspension or loss of certificate, and the comparative supersession of Royal Naval officers as Nautical Assessors. That this was working well and giving general satisfaction seemed to be the universal opinion, when suddenly a mine is sprung beneath our feet, first in the form of an anonymous pamphlet, and then as a Parliamentary paper, issued presumably in the interest of the public, but really in the interest of those Royal Naval officers who had acted so long as Nautical Assessors, that they seemed to have acquired a monopoly. In this paper it is assumed that the officers of the merchant service objected to the Royal Naval officers, because they were "harsh and inconsiderate," and (it was also vaguely hinted) because they did not care to play second fiddle to the Royal Navy. The one statement is as entirely untrue as the other is eminently narrow and childish, for the real contention has ever been that Royal Naval officers do not, and cannot know anything of the sailing or working of merchant ships—they have no adequate experience of the duties and difficulties with which the master of a merchantman has to deal, which is trading for the purpose of making as much money as possible, therefore, not having this knowledge, they are practically unfitted to be competent judges as to the accidents which happen to such ships. We all respect the bravery, ability, and energy of the officers of our Royal Navy, but we cannot but

realise that they have no knowledge of the difficulties with which the master of a merchant vessel has to contend; in point of fact they neither know, nor could they properly fulfil the duties of a master in the merchant service, consequently, how can they pretend to pronounce either impartially or as experts on the merits of a case wherein the niceties of these duties are involved? This is the point of view from which the merchant service has ever regarded the question, and we were prepared to rest content with having got the right of appeal, and the majority of the assessorships vested in Mercantile Marine officers, but now we find we have been dealing with an "unknown quantity." It may be very edifying and convincing evidence to the outside world for the Royal Naval officers to flourish in its face testimonials of assessorial good conduct from Lloyd's Committee, the Wreck Commissioner, &c., but it will hardly convince the Mercantile Marine, and that portion of the public interested in it, who have had years and years of cruel experience to the contrary. But leaving Lloyd's Committee out of the question, which we can well afford to do (and which it would do itself, were it to come to a question of underwriting a policy for a valuable vessel and cargo, which was to be commanded and navigated by a Royal Naval officer), we come to the chief factors in the case, viz.: the Wreck Commissioner, the stipendiaries and the justices of the peace. As for the latter, we all know what justice's justice is, especially in nautical cases, consequently we are not so much surprised at their opinions as at their bad taste, in needlessly rushing into a question which does not concern them one iota. As for the Wreck Commissioner and the stipendiaries, there is infinite surprise at *their* bad taste, for having to act as judges in these cases, they should have studiously avoided making any attempts to influence the composition of these Courts of Inquiry. They should bear in mind that the short Act of last year, took from them the power of appointing the Assessors for each investigation, which was theirs under the Act of 1876, and they must know that there were certain reasons for that step, which had better be left unmentioned; savouring as they do of an imputation of motives. But if the Wreck Commissioner persists in his attempts to upset the existing arrangement, he must be

prepared to hear some unpalatable truths, and also, the plain unvarnished opinion of the Mercantile Marine in the matter; he must be prepared to hear, that, however much we admire his judicial and legal ability, we cannot for one moment accept him as an authority as to who is, or who is not skilled in the seaman'ship of which our merchant service is the exponent. We are not quite children, and do not feel inclined "to shut our eyes, open our mouths, and see what the Wreck Commissioner will send us." This is all past, and we were prepared to let by-gones be by-gones. But in face of such a gross attempt to infringe our rights, be assured, the merchant service will not rest now, until there be a *total* exclusion of all Royal Naval officers from these assessorships. Are we to set the Wreck Commissioner's dictum concerning the "independency and efficiency of these Courts," above the strongly expressed opinion of experienced merchant shipmasters, of thirty and forty years standing? Certainly not! The expression may, or may not be a "flower of rhetoric," but we utterly fail to see any practical meaning in it. If by the word "independency," he alludes to the social position of the Royal Naval officers, as virtually independent of all mercantile interests and connections, his argument is as worthless as it is petty. We can point to masters in our merchant service, who are second to no Naval officer in social position, and who are too honourable to allow themselves to be influenced by any mercantile interest or connection.

If by the word "efficiency" he means that Naval officers, as seamen and gentlemen, are superior in education, training, and understanding to the masters of the merchant service, his argument is utterly against fact. Let him poll the leading ship-owners in the kingdom, and ask their opinion on that matter. Let him try to persuade some shipowning friend of his to give the command of one of his valuable ships to a Royal Navy man, and see what reply he will get. In the merchant service of this country there is ever a fruitful crop of men, who stand high above their peers, both in nautical skill and sound understanding, and from whom a goodly selection can always be made to fill the assessorships. Let this be done, and there will be complete con-

fidence in the Courts of Inquiry ; for when a man who holds a certificate from the Board of Trade, proclaiming him competent to fulfil the duties of master in the merchant service, does commit an error, he will feel that whatever the decision, be it acquittal or censure, it will be just, having been pronounced by men who, holding a similar certificate to himself, have yet stood out from their peers by performing those same duties with conspicuous ability throughout a long and honourable career. Again, if it be urged by the Wreck Commissioner that merchant shipmasters, acting as Assessors, are more lenient to their fellows than they should be, it is not only contrary to all experience, but it leaves the world's philosophy grievously at fault. Comparisons are odious, but to quote the world's philosophy, we "set a thief to catch a thief," and we ever find that "an old smuggler makes a good exciseman."

Yours, &c.,

December 17, 1880.

SINBAD.

NAUTICAL ASSESSORS.

To the Editor of the "Nautical Magazine."

SIR,—The navigating officers of the Navy as assessors appreciate the compliment which has been paid to them by their brother officers of the Merchant Service, and trust that their legitimate aspirations to retain the present regulations may be crowned with success. This feeling ought not to excite surprise, when it is borne in mind that a large proportion of the old staff captains and commanders entered the Royal Navy after they had acquired a practical professional education, which is not too common amongst the executive ranks of the service. From this circumstance, and the theoretical knowledge subsequently acquired, common sense would indicate, as your correspondent points out, that if naval officers are indispensable on Mercantile Courts of Inquiry (and I cannot see why they should be) why not appoint the men who are acquainted with the details and management of both services. The reason is obvious, and it is unnecessary to dilate on it here. In the present condition of the Merchant Marine the stowage of holds

is a most important factor in the safe navigation of ships, not alone from its effect on their behaviour at sea, but by the damage to perishable articles, which the neglect of proper precautions must induce. It is, or was, a custom in the Navy to consider this essential part of a seaman's duty degrading; consequently, it fell solely on the navigating class: indeed, it would be interesting to ascertain the number of hours which each of the naval assessors had spent in a hold, when actively employed. At the same time, be it remembered that there is scarcely a parallel between the stowage of men-of-war and merchant ships. In the first, the safety or the behaviour of the ship in nowise depends on the want of knowledge, or otherwise, of the officer of the hold, everything being arranged by the designer to avoid such a contingency. Thus the spirit-room, the bread-room, the slop-room, the tank-room, and the holds proper are separate spaces, and generally in different parts of the ship. The niceties of bilge and scantling, and the bedding of casks are not known, or, indeed, generally needed, as the superincumbent weight is seldom excessive. Another very important duty in Mercantile Courts, as the list of strandings and wrecks prove, is the investigation of compass errors. Now, many of the naval officers who are, or were assessors, have never served in an iron ship, and although a few may have picked up the rudiments of magnetism, it is to be feared that some would fail to discriminate the difference between red and blue magnetism, or to explain why a sailing ship when working against an east or west wind, retains the same signs of heeling over on either tack, and the converse with a north and south, &c., &c., &c.

At the present time it would be difficult to point out any position in ordinary life which requires more great qualities than the commanders of merchant ships, be they large or small—courage, tact, good temper, and great physical endurance are indispensable. With means, at the paucity of which many naval officers would stand aghast, he has to make the best of his way to a port of discharge. He cannot, without a loss of time and money, reef down if the barometer indicates that bad weather is possible, but must carry on sail to the last moment, and shorten it as he best can. It is not uncommon for him to wait until the bell strikes

eight to take in a topgallant sail, manning one or possibly two ropes at a time, and furling afterwards with both watches. In winter passages on the Atlantic, many officers never go regularly to bed, literally sleeping with one eye open, ready for that call which comes only too often. The naval man can no more realize this state of things than poor Marie Antoinette could that the French people were starving with such nice little patties on sale at two sous apiece.

The position and responsibilities of the officers of the Merchant Service require to be acknowledged and honoured in high quarters—why not institute an order of merit for them? The commanders of the large steamships of the great companies of London, Liverpool and elsewhere, are by law plain Mister, while the junior commissioned officer of the Navy, or a War Office clerk, is styled Esquire. One has helped to make his country great and rich, while the other has scarcely attained the age of manhood.

An old merchant assessor, a friend of the writer, not long since very modestly commented on this difference of status in the following terms:—"I feel that when I am sitting on these Courts of Inquiry with a naval officer that the presiding judge notices him far above myself, although on points of technical knowledge he may be my inferior. I am always ready to pay a becoming respect to officers of Her Majesty's Navy, but I think the time has arrived for investigations to be held without calling in gentlemen from a service which has nothing in common with ours." There is much truth and good sense in the remark, unless experience proves that such investigations are liable to be warped by prejudice—then, and not till then, should the representatives of another service sit as judges.

Yours obediently,

A FRIEND TO BOTH SERVICES.

[In the interests of the Mercantile Marine of this country we will gladly lend all the aid in our power, with a view to the retention of the arrangements now in force, which are satisfactory to the merchant service and to the country at large, and concerning the efficiency of which no complaint has yet been

heard. It is an entire mistake to suppose that in the course which we feel it our bounden duty to take there is anything in the shape of an attack upon the officers of H.M. Navy. We have the greatest respect for the gallant, high-minded, and highly-educated gentlemen who hold Her Majesty's commission to serve in the defence of our shores and enormous floating commerce; but we take it that they themselves will, as a body, admit that they are not qualified to form an accurate opinion of the conditions under which merchant ships are navigated, they having had no practical experience in the merchant service, in the same way as mercantile officers will readily acknowledge that they could not properly judge of the conditions of service and general arrangements on board a man-of-war. From the Parliamentary paper to which we referred in our last number, it would appear that the Naval officers regard this matter as, to some extent, a personal one; but the attempt to discredit the advocacy of the cause of the merchant officers, by saying that it is an attack on the Royal service, is merely a sidewind, intended to divert attention from the real question at issue. Let the question be argued fairly on its merits, we desire nothing else; we have no personal feeling whatever in the matter, and are most anxious to avoid anything in the nature of acrimony or recrimination. *Magna est veritas et prevalebit* is a good old-fashioned motto, to which we pin our faith, and being fully assured of the justice of the cause of the merchant officers, we shall continue to give it all the support in our power and await the issue.—ED. N. M.]

MEDICAL ATTENDANCE ON BOARD SHIP.

To the Editor of the "Nautical Magazine."

November, 1880.

SIR,—It is high time that the provision made by Act of Parliament for the medical attendance of seamen should be extended. The public feeling with regard to seaworthy ships is now being directed towards the crews of those ships, and the time has come that some further provision should be made for their proper care and attention in the case of injury and disease.

It would be useless, I fear, to advocate that every shipmaster taking charge of an ocean-going vessel should have had some instruction in minor surgery and medicine, such as he might obtain by a six months' course of practical training ; but I may go further and say that although this may be at present impracticable, it is not too much to expect that the shipowner shall take care that some member of the ship's company shall have had some practical instruction in these matters, such as might be obtained by a six months' course of study in a surgery or dispensary. It is little enough for the public to demand that the seamen should be able to have recourse in the event of illness to some one who has some knowledge and some experience which he has received from someone qualified to give it, and not be left entirely at the mercy of the shipmaster, however willing and however anxious for the patient's welfare he may be. How, indeed, can one expect him to be practically qualified for attending to the sick and afflicted, without any experience, and, I may say, without any knowledge of such things save such as he may obtain from the guidance of a book ? The master, too, has enough to do in attending to his ship without having also to bestow his care on matters so foreign to his calling as disease and injuries. What I would advocate then, in the case of ocean-going vessels, in addition to the advice I have already given with regard to steamers, is, that in every ship some member of the company, master, mate, or steward, should have had the practical instruction of which I speak.

This, at least, is due to the seaman, as well as to those immediately dependent upon him ; due also to those upon whose hands would fall the charge of providing for his wife and family in the case of his being incapacitated from work by death or otherwise ; nor is it too much for an enlightened, a sympathetic, and a benevolent public to demand.

Why, Sir, should the seaman be the only man who is unable to obtain skilled advice and assistance in the case of need ? The country very reasonably provides for this in the case of those who are unable to provide for it themselves ashore ; why should not this be the case also for those at sea ? The British seaman is taxed and rated like other members of the community, and he is not

only practically disfranchised, but positively debarred from those privileges in the case of injury and disease which are rightly and fairly accorded to all other members of the community.

If everyone who considers this will imagine himself placed in the position of the seafaring man laid down on the bed of sickness, whether from disease or injury, may we hope that even private charity, if not the public good, will bring about the necessary change. Let him remember, too, that a life saved is a life gained, and, that in all human probability, the ratepayers themselves would not find it to be to their disadvantage to insist upon a proper provision being made for those who, after all, are often the sole support of a wife and family.

But the Act of Parliament should first be extended in such a way that it may be made not only a question of numbers comprising a ship's crew or company, but also a matter of the probability or not of accident and of disease. In my opinion every ocean-going steamer should carry a qualified surgeon.

I am, Sir, yours faithfully,

A SEAFARING MAN.

"V. G." OR "G."

To the Editor of the "Nautical Magazine."

R. M. Officers' Club, Southampton,

November 30, 1880.

DEAR SIR,—We hear every day captains and the shipping world generally, complaining of the visible deterioration of seamen employed in the Mercantile Marine, and in many cases unfairly putting it down to the number of foreign seamen which at the present time man our ships.

With your kind permission I will encroach upon a small space of your valuable Magazine, by pointing out what I believe to be the real cause, viz. :—

The free and generous way in which certificates of "V. G." are awarded to the crew after a voyage. If men were discharged strictly according to their abilities, and a "V. G." only given when men were in every sense of the word "very good," and men who

could not be called "bad," but at the same time would not be entitled to a very good discharge, were to be awarded "G." or "D. R.," as the case might be, then, I submit that the class of men engaged would be altered. Captains of merchant vessels, when discharging their crews, are too apt to forget this very important point, and unless a man has committed himself seriously, either by insubordination or general incompetency, he is awarded a "V. G.," but with a quiet hint that his services will not be required any more, thereby giving that man the same chance of getting another ship as one who is really deserving; and apart from that, it is not just to the captains of other vessels, who cannot possibly estimate a strange man's character except by the discharge tendered on application.

If the practice of discharging strictly according to conduct and ability were more universally adopted, the visible decline of our seamen would be arrested, and the British Mercantile Marine would once more be able to boast the best and ablest men sailing salt water.

I am, Sir, your obedient servant,

R. M. S. P. Co.

C. J. B.

COMPASS DEVIATION.

To the Editor of the "Nautical Magazine."

SIR,—Some time ago, being on board a steamer commanded by a friend of mine, and hearing him complain that the "bridge compass," which also he used as a "standard," was most unsatisfactory, that the *deviations* were continually altering from day to day in crossing the Atlantic, I observed that it was placed within four feet of some upright iron stanchions forming part of the hand rail, round the bridge. On remarking this to him, he said that it was of little consequence, *as the stanchions and rails being galvanized had not much effect on the needle.* This statement seemed more extraordinary from him, as he had a long experience as master both in iron sailing ships and iron steamers, and I thought that if he held such an erroneous opinion, that there might be many more who believed the same; especially as he was a man who read every-

thing he came across about his profession—your valuable publication included.

In the "Elementary Manual for Deviation of the Compass in Iron Ships," by Captain F. J. Evans, R.N., F.R.S. (a book no shipmaster should be without), it says very distinctly, page 119, that it is an error to suppose "that the effect of iron in stanchions, or otherwise, is diminished by coating it with brass, canvas, paints, or other substances," and in a note, "magnetism exerts its influences through all bodies, even the most dense—this is a remarkable property, which is not possessed by light, heat, or electricity."

And regarding the position of the compass (standard), he says, on page 2, "It should also be in a position as far removed as possible from any mass of iron—at least 5 feet from iron deck-beams—and should not be within 10 feet of the extremity of any elongated iron mass, especially if vertical, such as funnels, stanchions, or the spindle of the wheel; and it should be received as a general rule that no iron, subject to occasional removal, is to be placed within 15 feet of the compass, either on the same deck or on that below it.

I am well aware, Sir, that these facts are known to most commanders, but it seems there are some who believe that galvanizing iron will weaken its effect, and there are numbers who do not sufficiently appreciate the effect of vertical iron, near the "standard compass."

All shipmasters must feel that in building most ships, the position of the standard compass (I suppose that all use a "standard" and not a steering compass) does not much trouble the builder. The ship is carefully swung before going to sea, a number of magnets placed to correct errors, sometimes even to the "standard," which compass, in my opinion, in sailing ships going to the southward of the equator, should not be corrected by magnets, unless the errors are very large, say over 12° or 14° . A card of deviations is given, and the master in going down channel on the ship's first voyage, usually finds deviations or errors which are not on that card, not only heeling errors, which are only at or near the north and south points, but others.

My object in writing, has been to draw attention to the fact, that no covering, either galvanised, or any other can weaken the effect of the iron so covered, and also to the difficulty there must continually be, in getting correct deviations, with so many pieces of vertical iron as there often are within 10 feet of the standard compass.

If you think this of sufficient importance to insert in the *Nautical Magazine*, my object will have been accomplished.

I am, Sir, yours truly,

J. G. G.,

Master in Sailing Ships.

144, Adelaide Road, London,

December 2nd, 1880.

SHIPPING CASUALTIES INVESTIGATIONS.

To the Editor of the "Nautical Magazine."

SIR,—Will you allow me a small space in your columns to call the attention of masters of ships to the importance of studying the tables of "Co-efficients of Fineness." I see that the Wreck Courts of Inquiry are relying on the tables and settling cases by them. Thereby the question of freeboard seems to have been really settled by Mr. Martell. In the case of the *Killeena*, tried by the learned Wreck Commissioner, assisted by Admiral Aplin and Captains Ward (of the Indian Navy) and Parfitt (of the Mercantile Marine), I find the following passage—in answer to the question put by the Counsel of the Board of Trade, whether the ship was overloaded.

The learned Wreck Commissioner said :—

"Now taking Mr. Martell's rule, we find that her co-efficient of fineness was .65, and that a vessel with a co-efficient of fineness of .65, and with a depth of hold of 19.2, or about 19 ft. 3 in., ought, strictly speaking, to have a freeboard of 4 ft. 7 in. On the other hand, it was said by the captain that a freeboard of 4 ft. would on a depth of hold of 19.2 ft. give exactly $2\frac{1}{2}$ in. for every foot depth of hold, and that he had always considered sufficient. What then we should be disposed to say, was, that this vessel, when she left New York, although fully laden, was not overladen."

Her clear side was 4 ft. 1 in. I have been reading the evidence given before the Royal Commissioners on Unseaworthy Ships and their report, and I find that the Commissioners were not prepared to accept Mr. Martell's tables. I find also on referring to the evidence given before the Select Committee on the Grain Cargo Bill, on behalf of Lloyd's Register and the Board of Trade, there is nothing to show that the shipowners, or Board of Trade, or Committee of Lloyd's Register had adopted these tables. But now I find from the *Killeena* and other cases, that when tables are referred to, they are the only ones on which the Wreck Commissioner and the Assessors give their decisions, in regard to whether a ship is or is not overloaded. My object in writing to you at the present time is to suggest that shipowners should, without further delay, obtain Mr. Martell's tables, and instruct their masters to act on them. This will be better than having their cases settled on them in ignorance on their part of what the tables are, and after the ship has disappeared; and, although the ship I have referred to in this letter "*ought strictly speaking*," to have had a freeboard of 4 ft. 7 in., and was not presumed to be overloaded though she had 6 in. less, a case may arise which the gentlemen who advise the learned judge on these difficult professional matters may think ought to be settled on what the load-line "*ought strictly speaking*" to be.

I do not in any way desire to impugn the judgment of the very clear-headed and able gentleman who presided over the Court, as it must be clear to your readers that the Assessors who assisted the judge, and not the judge himself, determined the questions of freeboard and grain loading, and selected the tables and other information on which they founded their opinion, so well delivered through his mouth.

A BROKER.

Liverpool, 19 Dec., 1880.

TIDE TABLES FOR JANUARY, 1881.

Also Ports of Reference for the Constants in the next Table.

WEAR DAY.	MONTH DAY.	LONDON BRIDGE.			HULL.			NORTH SHIELDS.			LEITH.			DEVON- PORT.			DOVER.			WESTON- SUPER- MARE.			LIVER- POOL.			GREEN- OCK.			QUEENS- TOWN.			KINGS- TOWN.			LONDON- DERRY.			BREST.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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S	1	1.55	2.21	6.34	7	0	3.27	3.52	2.26	2.51	5.49	6.10	11.23	11.52	7	6	7.33	11.22	11.58	—	0.23	0.46	1.13	6.5	6.29	—	0.11	9	0	9.22	4.48	5.11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—</

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

ing the Tidal Constant of the place, according to its sign (+ add.
the time of high water on the given day at the port of reference, you
e of high water at the place sought.

CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
H. M.			H. M.	
..... -1 17	Leith	Jersey (St. Helier)	+2 38	Brest
..... -5 52	Liverpool	Kinsale	-0 18	Queenstown
..... +2 59	Brest	Lerwick (Shetland) ..	-3 47	Leith
..... +5 13	Dover	Limerick	+1 15	Queenstown
..... -0 42	Leith	Lisbon bar	-1 17	Brest
..... +0 50	Brest	Littlehampton	+0 34	Dover
..... -2 25	Kingstown	Llanelly bar	-0 38	Weston-s.-Mare
..... -0 18	Greenock	Lowestoft	-4 1	London
..... -1 49	Leith	Lynn & Boston Deep ..	-0 29	Hull
..... -1 14	Queenstown	Margate	-2 18	London
..... -0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
..... -0 2	Brest	Millford Haven entr. ..	-0 58	Weston-s.-Mare
..... +0 8	Dover	Montrose	-0 52	Leith
..... -0 51	Liverpool	Morlaix	+1 6	Brest
..... +2 42	Londonderry	Needles point	-1 26	Dover
..... -1 5	N. Shields	Newcastle	+0 23	N. Shields
..... -0 8	N. Shields	Newhaven	+0 39	Dover
..... +3 3	Brest	Newport	+0 16	Weston-s.-Mare
..... +0 13	Dover	Nieuport	+1 6	Dover
..... +0 23	Devonport	Nore	-1 28	London
..... +0 19	Weston-s.-Mare	Orfordness	-2 43	London
..... -2 2	Brest	Operto	-1 17	Brest
..... -1 53	Liverpool	Ostendo	+1 13	Dover
..... +0 37	Dover	Padstow	-1 41	Weston-s.-Mare
..... -0 23	Greenock	Peel, Isle of Man	-0 15	Liverpool
..... +0 2	Weston-s.-Mare	Pennbrooke Dock	-0 42	Weston-s.-Mare
..... +4 23	Liverpool	Penzance	-1 13	Devonport
..... -0 10	Kingstown	Peterhead	-1 45	Leith
..... -0 47	London	Piclarbour, Barrow ..	-0 18	Liverpool
..... +4 2	Brest	Plymouth breakwater ..	-0 6	Devonport
..... -1 37	Londonderry	Poole	-2 2	Dover
..... -0 23	N. Shields	Port Carlisle	+0 47	Liverpool
..... -0 10	Brest	Portland breakwater ..	+1 18	Devonport
..... -0 27	Dover	Port Patrick	-0 58	Greenock
..... +4 41	Greenock	Portsmouth	+0 29	Dover
..... -2 21	Leith	Ramsgate	-2 19	London
..... +0 38	Devonport	Rotterdam	+4 33	Dover
..... +0 3	Dover	Santander	-0 17	Brest
..... +7 19	Brest	Scarborough	+0 48	N. Shields
..... +0 3	Kingstown	Selsea bill	+0 33	Dover
..... +0 17	Queenstown	Sheerness	-1 21	London
..... -0 11	Liverpool	Shoreham	+0 23	Dover
..... +0 2	Kingstown	Sligo bay	+0 17	Queenstown
..... -0 16	Kingstown	Southampton	-0 42	Dover
..... -0 27	Dover	Spurn point	-1 3	Hull
..... +0 56	Dover	St. Ives	-2 10	Weston-s.-Mare
..... +0 38	Devonport	St. Malo	+2 18	Brest
..... -0 46	Devonport	St. Mary (Scilly)	-1 16	Devonport
..... +6 57	Brest	St. Nazaire	-0 7	Brest
..... -0 47	Brest	Stornoway	+6 38	Greenock
..... -1 59	Hull	Stromness (Orkneys) ..	-5 17	Leith
..... -0 13	Liverpool	Sunderland	-0 1	N. Shields
..... -0 5	Dover	Swansea bay	-0 53	Weston-s.-Mare
..... -0 29	Devonport	Tay bar	-0 11	Leith
..... +1 42	Dover	Tees bar	+0 22	N. Shields
..... -0 26	Queenstown	Tenby	-1 12	Weston-s.-Mare
..... -1 27	Brest	Thurso	-5 49	Leith
..... +0 10	Greenock	Torbay	+0 17	Devonport
..... +2 61	Weston-s.-Mare	Tralee bay	-0 58	Queenstown
..... +2 26	Brest	Ushant (Ouessant) ..	-0 15	Brest
..... -0 48	London	Valentia harbour	-1 19	Queenstown
..... -0 53	Hull	Waterford	+0 19	Queenstown
..... +2 30	Brest	Westport	-0 4	Queenstown
..... +0 5	N. Shields	Wexford	+2 20	Queenstown
..... -1 52	London	Whitby	+0 22	N. Shields
..... +6 4	Brest	Whitehaven	-0 9	Liverpool
..... +0 21	Dover	Wick	-2 55	Leith
..... -1 12	Liverpool	Wicklow	-0 41	Kingstown
..... -0 53	N. Shields	Workington	-0 19	Liverpool
..... +5 42	Brest	Yarmouth road	-4 43	London
..... -1 59	Leith	Youghall	+0 13	Queenstown

NOTES FROM CONSULAR REPORTS.

NETHERLANDS.

Surinam.—Trade has been better than in the preceding year. The gold industry continues to increase, and the exports of sugar, cocoa, coffee, cotton, molasses and rum in 1879 compare favourably with those of 1878.

Next to the mother country, Great Britain appears to have the greatest trade with this Colony, but the entire tonnage from all other countries amounts to about 22,700.

PERSIA.

Tabreez.—The trade of the province of Azerbaijan appears to have been in a very sorry condition in the early part of the year. Deficient crops and general scarcity seemed to rule, while the market was overstocked with European goods. Whether the trade has since improved is not yet made known, but there was every prospect of more favourable crops in the season then ensuing.

PERU.

Callao.—The Consul's report in regard to Callao was generally of a favourable nature, but was brought to an abrupt conclusion by the establishment of a blockade by the Chileans.

Callao is one of the largest and safest ports in the Pacific where the loading and discharging of vessels is never impeded by weather. The bay is semi-circular in form and accessible at all times of the year. Excellent anchorage and well-constructed docks.

The city, however, is offensive as a place of residence.

Trade appears to have been fairly brisk in one direction, the imports from all countries amounting in value to upward of £1,000,000. Exports show a considerable falling off amounting only to about £380,000. The imports were coal, wheat, goods, ships' stores, furniture, kerosene, agricultural implements, railway plant, &c. The exports were sugar, nitrate and guano.

but it is in regard to the two latter articles that the falling off is chiefly noticeable.

Mollendo.—Owing to the war between Chile and Peru the commerce of this port has fallen off considerably. Up to the date of the port being open a fair export and import trade was carried on, but the blockade established at the end of last year has put a stop to commerce, and great distress and want are felt in the district.

RUSSIA.

Wiborg.—To this port, coal, iron and salt are imported from Great Britain, and from the port timber is exported chiefly to France, Holland, and Great Britain.

The Consul reported that the prospects for the timber trade for 1880 were good.

SANDWICH ISLANDS.

Honolulu.—The Consul General's report shows an increase in the value of both exports and imports over that of 1878. The articles of export are sugar, rice, coffee, and wool, and in 1879 the whole crop of sugar of 49,016,276 lbs. went to the United States port of San Francisco free of duty, and nearly all of the rice crop also. The Americans have undoubtedly the best part of the trade of these islands, but there appears to be every encouragement for British importations. It is said that 30 new sugar plantations were about to be started, and that most of them would receive their machinery from Glasgow.

SWEDEN AND NORWAY.

Christiania.—The trade of Norway does not appear to be improving, the value of exports and imports showing a decline on that of preceding years. This is accounted for by the diminution in value of the timber and wood goods' trade, which, with fish and fish products, are the staple articles of commerce in Norway. In 1879, the largest trade both export and import was carried on with Great Britain, the trade with Germany having declined.

The Consul General thinks that timber and salt fish will for some time continue to form the staple articles of export from Norway, but he adds that each year sees some new industry rising in im-

portance and value, some of which require to be fostered and aided by foreign capital and individual enterprise. The manufacture of paper is apparently a growing industry, and promises to become an important element in the export trade. Furs, game, cattle, and oats are all likewise showing signs of becoming profitable articles of export.

The profits of the general shipping trade of the country appear to be considerable.

TRIPOLI.

Bengazi.—Wheat and barley are the only articles of any importance raised in this province, and the failure of the crops last year has made the commerce of the district extremely unsatisfactory. The extensive lagunes in the neighbourhood yield on an average 200,000 tons of salt, the produce last year being valued at £40,000. This is a Government monopoly. British shipping trade appears to be passing into the hands of some enterprising Greek merchants, and articles which were formerly supplied from Malta are now brought from Trieste and the Island of Crete. There is a good deal of complaint in regard to the harbour which is being allowed to silt up with sand. On the whole the Consul's report is far from encouraging.

TURKEY.

Samos.—Raisins, wine, olive oil, tanned hides are the principal goods exported from this island, the bulk being sent to Turkey, Egypt, France, Austria, and Germany. The total value of exports in 1879, amounted to £167,740. The imports consist chiefly of manufactured and colonial goods from England, Austria, and Germany; cereals and other articles from Turkey and Egypt, of a total value of £171,690 for 1879.

The Consul reports a satisfactory increase of trade, especially the export of wine to France. Sundry works are in hand with a view to facilitating the entry of shipping to the ports.

URUGUAY.

Colonia.—Cattle farming is pursued in this district with much success, although the Consul reports that business in general has

been dull. The wheat crop was not successful owing to want of rain, but maize has not suffered so much. Sheep flocks have done well, and a large price was obtainable for wool. Little direct export trade is carried on.

VENEZUELA.

Puerto Cabello.—Coffee and copper ore from the mines of Aroa were the chief exports in 1879, Germany and Great Britain being the largest receivers. The total value was £667,672. Details of imports are not given but in this branch again Great Britain and Germany take the lead. The total value of imports was £468,190. This port is visited monthly from Europe by four British steamers, two Germans, and three French; also two Germans from the United States.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. W. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C.; 6, Lord Street, Liverpool; and 10, Berridge Street, Leicester.

ENGLISH (APPLICATIONS).

4708. Robert Jones and John Jones, both of Rhyl, Flint. "Improvements in and appertaining to apparatus for sounding the depth of water in ships' wells and other places or situations."

4719. Harvey Klapp Carter and James Francis Wood, both of Canwen, New Jersey, and John Bacon Wood, Philadelphia, Pennsylvania, U.S.A. "Improvements in wooden ships or vessels." (A communication.)

4754. Robert Wotherspoon, Liverpool. "Improvements in or applicable to steering gear, which improvements are applicable for

other purposes where sudden strains are brought to bear on chains, ropes, or other tackle."

4831. Ole Christensen Bjerke, Christiana, Norway. "Improvements in the method or means of killing and catching whales and other large sea animals."

4839. Frederick Hime, Junior United Service Club, Middlesex. "New or improved means or apparatus for propulsion of bodies in air, applicable also for propelling ships or other vessels in water."

4852. William Bury, London. "Improvements in valve and valve guides for the air and circulating pumps of marine engines, which improvements are applicable also to valves for other purposes."

4855. Patrick Mihan Chelsea, Massachusetts, U.S.A. "Improvements in apparatus for ventilating ships' cabins, storehouses, and other enclosed spaces." (A communication.)

4875. John Daniel Custance, Romford, Essex. "Improvements in screw-propellers."

4885. Charles Maw, Hyde Park Terrace, Middlesex. "Improvements in driving screw-propellers."

4889. Alphonse Lafargue, Kensington, Middlesex. "Improvements in the arrangement and construction of machinery or apparatus for lifting and moving heavy weights by hydraulic power, applicable to ships' cranes and winches, portable cranes, lifts, hoists, turn-tables, pile-driving machines, and other like appliances."

4909. Jacob Edson, Boston, Suffolk, Massachusetts, U.S.A. "Improvements in diaphragm ships' pumps."

4915. William Clarke and John Brokenshire Furneaux, Gateshead-on-Tyne. "Improvements in steam steering-gear."

4957. Frederick William Richardson, West Hartlepool. "Improvements in the method of and apparatus for propelling vessels by means of hydraulic power."

5007. James Readman, Norton, Durham. "Improvements in mariners and azimuth compasses."

5011. Stephen Paschall Morris Tasker, Philadelphia, Pennsylvania, U.S.A. "An improvement in diving apparatus." (Complete specification.)

5034. John Samuel White, East Cowes, Isle of Wight. "Improvements in steamships and in the mode of steering the same."

5059. Samuel Crawford, Clyde Bank, Dumbarton. "Improvements in and connected with water-tight doors for ships."

5093. William Cooke and Daniel Mychreest, both of Liverpool. "Improvements in and in connection with screw-propellers."

5153. William Shakespeare Welton, Malpaso, U.S.A. "Improvements in the propulsion of vessels." (A communication.)

AMERICAN.

233376. Theodore O. L. Schrader, New York. "A self-levelling berth for vessels."

233547. Lewis H. Raymond, New York. "A boat plug."

233778. John H. Laskey, Boston, Mass. "A self-levelling dining table for vessels."

233876. Adolph F. A. Petersen, Hamburg, Germany. "A mechanism for controlling the steering-gear of vessels."

234180. John Gorman, Philadelphia, Pa. "A steering apparatus for vessels."

234551. Jacob Edson, Boston, Mass. "A diaphragm ship's pump."

234594. Richard F. Loper, jun., Stonington, Conn. "Means for raising and lowering ships' rudders."

234607. Benjamin Palmer, Chicago, Illinois. "Mechanism for propelling vessels."

234673. David Huston, Boston, Mass. "A self-levelling berth for vessels."

234794. Charles G. Lundberg, Helsingborg, Sweden. "The construction of ships."

BELGIAN.

52443. T. Sample. "An improved automatic disconnecting gear for ships' boats."

FRENCH.

135129. De Caux. "Improvements in apparatus employed in deep-sea fishing or trawling."

185340. Stevens and Smith. "Improvements in screw-propellers for propelling vessels; applicable also for raising and forcing liquids."

LIFE-SAVING RAFTS.

1601. April 19th, 1880, Marie Beasley, Philadelphia, Pennsylvania, U.S.A. "Improvements in life-saving rafts." (A communication.) Price 6d. A number of hollow metallic rectangular floats, with their ends bevelled on the under side, are hinged together, so as to be folded together when not in use, and spread out flat when in use; and combined with these floats is a railing, or guard, hinged, so as to fold parallel with the floats when not in use, and when in use fastened at the corners, so as to enclose the deck of the raft and furnish supports for the seats. The hollow floats form receptacles for provisions, the opening being closed by a plug.

TORPEDO BOATS.

3250. August 9th, 1880. Benjamin Berkley Hotchkiss, Paris, France. "Improvements in torpedo boats." (A communication.) (Complete specification.) Price 6d. The invention consists in a torpedo boat of circular or elliptic cross section, which, by means of moveable floats of cork or other light material, can be sunk sufficiently deep under the surface to be protected from the enemy's fire, and which, except such part of the pilot-house, chimney and air-pipe, presents in the position above the surface only the floats which are not destructible by projectiles.

ERRATUM.—In the article on Torpedo Vessels, page 983 of our last number, the speed of the *Lightning* is stated as 10 knots, it should be 18 knots.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	PLACE.	SUBJECT.
1	ENGLAND—East Coast—Humber River— Winteringham	Additional light for Ancholme Channel.
2	IRELAND — South-East Coast — Saltee Islands—Coningsbeg Light-vessel	Intended alteration of fog-signal.
3	NORTH SEA — Netherlands — Ameland Island	Intended new light.
4	" Ems River — Borkum Flat Light-vessel	Not in position.
5	" Weser River—Bremerhaven	New leading light.
6	" Sylt Island—Munkmarsch	Alteration in colour of leading light.
7	" Lister Deep—Hoyer	Alteration in colour of leading light.
8	BALTIC — Prussia—Frische Haft—Fisch- hausen	Alterations in mole light.
9	" Gulf of Finland—Dagö—North Ristna Point	New ice-signal at lighthouse.
10	SPAIN—Cadix Harbour	Buoyage of harbour and approaches.
11	MEDITERRANEAN—Coast of Tripoli	Intended new lights.
12	" Tripoli, Caudia, and Kos Gulf and Channel	New lights established.
13	" Gulf of Smyrna—Yani Kedese and Sanjak Spit	Alteration in colour of lights.
14	BLACK SEA—Asia Minor—North Coast— Vona Point, Tchiva Point and Cape Bafra	New lights.
15	EASTERN ARCHIPELAGO — Sumatra — Sunda Strait—Flat Cape	Particulars of the light.
16	" Banka Strait—Tanjong Oelar	New light.
17	CHINA SEA—Carimata Strait—Nort-East Approach	Reported sunken danger.
18	" Hainan Strait	Non-existence of a reported danger.
19	CHINA—East Coast—Han River Entrance —Swatow—Dove Rock	New buoy with automatic whistle.
20	" Gulf of Pecheli—Mian-tau Islands —Houki Island	New temporary light.
21	" " Felho River Entrance —Taku Bar Light-vessel	Light re-established, also a fog- signal.
22	AUSTRALIA — East Coast — Great Sandy Strait—Wide Bay Bar	Sailing directions.
23	" " Flat Top Island— Pioneer River	Sailing directions for inner an- chorage.
24	" South Coast—Port Phillip Entrance—Point Lons- dale and Swan Spit	Red lights deepened in-colour.
25	SOUTH AUSTRALIA—Rivoli Bay—Beachport	New red light during construction of jetty.
26	NEW ZEALAND—North Island—West Coast —Maunkau Harbour	South Head leading mark no longer available.
27	PACIFIC COAST—United States—California —Santa Cruz Point	Alteration in colour of light.
28	UNITED STATES — Delaware — Overfalls Shoals	New automatic signal-buoy.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

1.—ENGLAND.—East Coast.—Humber River.—Additional Light
near Winteringham.—In order to facilitate the navigation of

Ancholme channel, there is now exhibited an additional light from the high beacon near Winteringham, south shore of Humber river; the light is *fixed white*, elevated 40 feet above high water. The shore in this locality being frequently flooded, the light will be exhibited to assist vessels navigating up the river.

2.—IRELAND.—*South-East Coast.—Saltee Islands.—Coningbeg Light-Vessel.—Intended Alteration in Fog-Signal.*—It is proposed on 1st April, 1881, or as soon after as possible, to make the following alteration: the signal will be *one blast* from the siren of *two and a-half seconds'* duration, repeated after an interval of *twenty-five seconds*, and followed by *ninety seconds* of silence. Further notice will be given.

3.—NORTH SEA.—*Netherlands.—Intended Light on Ameland Island.*—To be exhibited in the spring of 1881, from a lighthouse now in course of construction on the western sand hill of Ameland island; it will be a *triple flashing* light, showing *three white flashes every thirty seconds* in the following order—*flash two seconds, eclipse three seconds, flash two seconds, eclipse three seconds, flash two seconds, long eclipse eighteen seconds*, elevated 187 feet above high water, and visible from a distance of 20 miles. The lighthouse (proposed to be painted reddish brown with broad white bands), 154 feet high, circular in shape and constructed of iron, is situated N. by W. $\frac{1}{2}$ W. from Hollum church tower, distant 1,968 yards. Position, lat. $53^{\circ} 27' 0''$ N., long. $5^{\circ} 37' 35''$ E.

Note.—The lighthouse is so far advanced, that it may be now used as a land mark. *Variation*, 16° W.

4.—NORTH SEA.—*Ems River.—Borkum Flat Light-Vessel.*—This light-vessel has been removed from her station.

5.—NORTH SEA.—*Weser River.—Leading Light at Bremerhaven.*—Exhibited from a beacon erected on the slope of the sea wall, westward of the entrance to the Kaiser harbour, Bremerhaven; it is a *fixed white* (gas) light, elevated 46 feet above high water, and visible from a distance of about 11 miles. The beacon consists of a wooden frame building 28 feet high (northern side painted white), and is situated N. 20° W. from the principal lighthouse, distant 1,197 yards. Position, lat $53^{\circ} 32' 50''$ N., long. $8^{\circ} 34' 5''$ E.

Note.—This light in line with Bremerhaven light leads through Wremen eastern channel as far as Brinkamahof fort. *Variation*, $14\frac{1}{2}^{\circ}$ W.

6.—NORTH SEA.—*Sylt Island.*—*Alteration in Colour of Southern Leading Light at Munkmarsch.*—The light has been changed from a fixed white light to a fixed red light, visible between the east coast of Sylt island and the bearing of W. by S.

7.—NORTH SEA.—*Lister Deep.*—*Alteration in Colour of Western Leading Light at Höyer, head of Höyer Deep.*—The light has been changed from a fixed white light to a fixed red light, visible between the bearings of E. by S. and S.S.E.

8.—BALTIC.—*Prussia.*—*Frische Haff.*—*Northern Shore.*—*Fischhausen.*—*Alterations in Mole Light.*—The fixed red light is discontinued, and in lieu thereof a fixed white light is exhibited, elevated 26 feet above the sea.

9.—BALTIC.—*Gulf of Finland.*—*Dagö.*—*West End.*—*Ice Signal at North Ristna Point Lighthouse.*—The signal is a black ball, shown from the gallery of the lighthouse, when there is ice in the Gulf of Finland.

10.—SPAIN.—*Buoyage of Cadiz Harbour and Approaches.*—Cadiz harbour and approaches are now marked by one beacon and seven buoys; of which on entering, the beacon and buoys painted black must be left on the starboard hand and the buoys painted red on the port hand. They are as follows:—

1. *Cochinos Shoal.*—A black bell buoy, No. 1, is moored in $5\frac{1}{2}$ fathoms N.N.W. of the shoal with San Sebastian lighthouse bearing S. $\frac{1}{2}$ W., distant $1\frac{1}{10}$ ths mile.

2. *Las Puercas.*—A beacon consisting of an iron tube painted in black and white bands is placed on this shoal; it is dry at low water; the top is 10 feet above high water; from the beacon San Sebastian lighthouse bears S.W., $1\frac{1}{10}$ ths mile.

3. *El Diamante.*—A red buoy, No. 3, surmounted by a red ball, is moored in $4\frac{1}{2}$ fathoms to the south-west of El Diamante shoal, with San Sebastian lighthouse bearing S.W. $\frac{1}{2}$ S., distant 2 miles.

4. *Fraile Shoal.*—A black buoy, No. 5, is moored in $3\frac{1}{2}$ fathoms E.N.E. of Fraile shoal, San Sebastian lighthouse bearing S.W. by W. $\frac{1}{2}$ W., $1\frac{1}{10}$ ths mile.

5. *Santa Catalina* or *North Channel*.—*Cabezo de los Asnos*.—A red buoy, No. 2, is placed in $4\frac{3}{4}$ fathoms on the outer part of Cabezo de los Asnos shoal, with south extreme of town of Rota bearing N.E. by E., $1\frac{1}{10}$ ths mile.

6. *La Galera Shoal*.—A black buoy, No. 4, is placed in 6 fathoms to the north-west of Galera shoal, Santa Catalina castle bearing E. $\frac{3}{4}$ S., distant $1\frac{1}{2}$ mile.

7. *Puntales Channel*.—*Cabezuela Shoal*.—A red buoy, No. 6, is placed in $5\frac{1}{2}$ fathoms to the west of Cabezuela shoal, with Matagorda castle, S. by E. $\frac{1}{2}$ E., $1\frac{1}{10}$ ths mile distant.

8. *Palma Shoal*.—A red buoy, No. 7, is placed in $4\frac{1}{4}$ fathoms to the north-east of Palma or Santo Domingo shoal, Matagorda castle bearing S.E. $\frac{1}{2}$ S., distant 8 cables.

Note.—The bearings and distances given against the several buoys must be regarded as approximate, but will assist the navigator in placing them on his charts. *Variation*, 18° W.

11.—*MEDITERRANEAN*.—*Coast of Tripoli*.—The lighthouses undermentioned are in course of construction, and the intended lights will be exhibited as follows:—

1. *Light at Lebidah*.—The light to be exhibited at Lebidah (Omz or Homs) should be visible from a distance of 15 miles. Position approximate, lat. $32^{\circ} 40' 0''$ N., long. $14^{\circ} 16' 0''$ E.

2. *Light on Cape Misratah*.—The light to be exhibited on cape Misratah should be visible from a distance of 15 miles. Position approximate, lat. $32^{\circ} 23' 0''$ N., long. $15^{\circ} 12' 0''$ E. Further notice will be given of the date on which these two lights will be exhibited.

12.—*MEDITERRANEAN*.—With reference to Notice, during 1879, on the intended exhibition of certain lights in the Mediterranean, the following are now established:—

1. *Coast of Tripoli*.—*Light at Tripoli*.—From an angle of the rampart on the summit of Kasba fort, at the western extreme of the town of Tripoli; it is a revolving light with a flash every minute, elevated 115 feet above the sea, and visible from a distance of 18 miles. Position, lat. $32^{\circ} 54' 5''$ N., long. $13^{\circ} 10' 50''$ E.

2. *Coast of Tripoli*.—*Light at Ben-Ghazi*.—Exhibited from near the mill on cape Sedi Kreibeesh (Khrebisch), at the north-

eastern part of the town of Ben-Ghazi; it is a *revolving* light with a *flash every thirty seconds*, elevated 72 feet above the sea, and visible from a distance of 15 miles. Position, lat. $32^{\circ} 7' 25''$ N., long. $20^{\circ} 2' 45''$ E.

3. *Coast of Tripoli.—Light at Dernah.*—Exhibited from near the Marabout on Ras Boashah, about half a-mile westward of the anchorage off Dernah (Derna); it is a *revolving* light with a *flash every minute*, elevated 92 feet above the sea, and visible from a distance of 15 miles. Position, lat. $32^{\circ} 46' 0''$ N., long. $22^{\circ} 39' 45''$ E.

4. *Coast of Tripoli.—Light on Gavdo Island.*—Exhibited from the summit of Gavdo (Gozzo) Island, (southward of Candia or Crete); it is a *revolving* light with a *flash every minute*, elevated 1,181 feet above the sea, and visible from a distance of 25 miles. Position, lat. $34^{\circ} 49' 40''$ N., long. $24^{\circ} 4' 30''$ E.

5. *Candia or Crete.—Light on Cape Sidero.*—Exhibited near the extremity of cape Sidero, the north-east extreme of Crete; it is a *revolving* light with a *flash every minute*, elevated 138 feet above the sea, and visible from a distance of 18 miles. Position, lat. $35^{\circ} 19' 0''$ N., long. $26^{\circ} 19' 45''$ E.

6. *Candia or Crete.—Lights on Cape St. John.*—Exhibited from the extremity of cape St. John (Aghios Joannis or Spinalonga), north-east coast of Crete; they are *fixed white* lights placed vertically; the upper light, elevated 148 feet above the sea, should be visible from a distance of 12 miles. Position, lat. $35^{\circ} 20' 10''$ N., long. $25^{\circ} 47' 0''$ E.

7. *Candia or Crete.—Suda Bay.—Suda Islet Light.—Alteration in Colour.*—The fixed green light is discontinued, and in lieu thereof a *fixed white* light is exhibited, visible from a distance of 10 miles.

8. *Asia Minor.—Kos Channel.—Hussein Point Light.—Alteration in Colour.*—The fixed green light is discontinued, and in lieu thereof a *fixed white* light is exhibited, which should be visible in clear weather from a distance of 10 miles.

9. *Asia Minor.—Gulf of Kos.—Lights at Budrüm.*—Exhibited from the lazaretto (in ruins) on the western side of the entrance to Budrüm (Boudroum) harbour. The two lights are *fixed* lights

placed vertically—the upper light elevated 49 feet above the sea, should be visible from a distance of 10 miles. Position, lat. $37^{\circ} 2' 0''$ N., long. $27^{\circ} 27' 0''$ E.

13.—MEDITERRANEAN.—*Gulf of Smyrna*.—The following changes have recently been made:—

1. *Yani Kedese Lights*.—*Alteration in Colour*.—The lights exhibited from the light-vessel moored off the extremity of Yani Kedese (Pelican, Hermus, or Keder) spit, northern side of entrance to Smyrna harbour, have been altered. The two green lights are discontinued, and in lieu thereof, two *fixed white* lights placed vertically are exhibited, visible from a distance of 10 miles—the upper light is elevated 49 feet above the sea.

2. *Sanjak Spit Lights*.—*Alteration in Colour*.—The lights exhibited from the light-vessel moored at the extremity of Sanjak (Sandjak) spit, northern side of entrance to Smyrna harbour have also been altered. The two green lights are discontinued, and in lieu thereof, two *fixed white* lights placed vertically are exhibited, visible from a distance of 10 miles—the upper light is elevated 49 feet above the sea.

14.—BLACK SEA.—*Asia Minor*.—*North Coast*.—The following lights are now exhibited:—

1. *Light on Vona Point*.—Exhibited from a position 54 yards from the extremity of Vona point; it is a *fixed white* light elevated 131 feet above the sea, and visible from a distance of 12 miles. Position, lat. $41^{\circ} 8' 0''$ N., long. $37^{\circ} 48' 15''$ E.

2. *Lights on Tehiva Point*.—Exhibited from the extremity of Tehiva (Iris) point; the two lights are *fixed red* lights placed vertically—the upper light is elevated 49 feet above the sea, and visible from a distance of 8 miles. Position, lat. $41^{\circ} 20' 40''$ N., long. $36^{\circ} 38' 15''$ E.

3. *Lights on Cape Bafra*.—Exhibited from cape Bafra (Baffra) or Halys point, the northern extremity of the islet formed by the two arms of the river Kysyl Irmak (Kazil Limak); they are *fixed white* lights placed vertically—the upper light is elevated 49 feet above the sea, and visible from a distance of 10 miles. Position, lat. $41^{\circ} 44' 0''$ N., long. $35^{\circ} 59' 0''$ E.

15.—EASTERN ARCHIPELAGO.—*Sumatra*.—*Approach to Sunda*

Strait.—Particulars of Flat Cape Light.—With reference to Notice 397, Vol. for 1880, this light shows *three flashes* in quick succession every twenty seconds.

16.—EASTERN ARCHIPELAGO.—*Banka Strait.—Light on Tanjong Oelar.*—Exhibited from a lighthouse on Tanjong Oelar, west coast of Banka island; it is a *fixed red* light visible in the northern entrance of Banka strait from a distance of 5 miles. The lighthouse is constructed of wood and painted white, with keeper's dwelling near it. Position on chart approximate, lat. $1^{\circ} 57' 0''$ S., long. $105^{\circ} 8' 0''$ E.

17.—CHINA SEA.—*Carimata Strait.—North-East Approach.—Reported Sunken Danger.*—This danger (*Twilight reef*), on which the American ship *Twilight* struck, is stated to be situated in lat. $1^{\circ} 1' 1''$ S., long. $108^{\circ} 38' 30''$ E. At about 4 miles S.S.W. $\frac{1}{2}$ W. of the above position, a ship, probably aground, was seen with only lower masts standing. These reefs lie about 40 miles from the nearest land of Borneo, and with Carimata peak on a S.S.E. $\frac{1}{2}$ E. bearing. Variation, $1\frac{1}{4}^{\circ}$ E.

18.—CHINA SEA.—*Non-existence of Sunken Rock Eastward of Hainan Strait.*—With reference to the existence of a rock reported to have been seen in 1880, by M. Rapatel of the French mail packet *Oxus*, also in 1878 from the English steam-vessel *Minerva*, in a position 67 miles E. $\frac{3}{8}$ S. from Hainan head; information has been received from Captain R. Napier, H.M. surveying vessel *Maggie*, that having made an examination extending over two days on and near the assigned position, no trace of shoal ground was detected. The *Maggie* under favourable conditions, and with special look-outs from aloft as well as from the deck, sounded over an area extending 9 miles north, 8 miles south, and 10 miles both east and west of the reported position of the danger, but depths of not less than 38 fathoms were obtained. Tide rips, with heavy overfalls, were repeatedly seen; these overfalls, near the reported position of the rock, were so heavy that a steam cutter was sent to examine what appeared to be shoal ground with broken water, but the depth found, when so near to the overfall that the boat was in danger of swamping, was 48 fathoms mud. Captain Napier is of opinion, that it is improbable the rock reported,

exists within the space traversed by the *Maggie*. It has been removed from the charts. *Variation*, 1° E.

19.—CHINA.—*East Coast*.—*Han River Entrance*.—*Swatow*.—*Buoy with Automatic Whistle near Dove Rock*.—Placed about two cables south-eastward of the pinnacle of Dove rock; this buoy, red and black chequered, and 10 feet in diameter at the water line, is moored in $4\frac{1}{2}$ fathoms water, marking the south-east extremity of the shoal ground.

20.—CHINA.—*Gulf of Pecheli*.—*Miau-tau Islands*.—*Temporary Light on Houki Island*.—On 28th August, 1880, a temporary light was exhibited from a little southward of the summit of Houki (Howki) island, Miau-tau islands; it is a *fixed white* light, elevated 300 feet above the sea, and visible from a distance of 10 miles. Position approximate, lat. $38^{\circ} 3' 30''$ N., long. $120^{\circ} 39' 0''$ E.

Note.—This light is obscured through a small arc in a northerly direction by the lighthouse buildings in course of construction.

21.—CHINA.—*Gulf of Pecheli*.—*Peiho River Entrance*.—*Taku Bar Light-Vessel and Fog-Signal*.—In consequence of the foundering of the light-vessel, the light had been temporarily discontinued. It is now re-exhibited. On 27th August, 1880, *Taku* light-vessel was moored in 17 feet at low water spring tides, with Bar entrance buoy (red) bearing N. $36\frac{1}{4}^{\circ}$ W., distant $3\frac{1}{2}$ miles. It is a *fixed white* light, elevated 37 feet above the sea, and visible from a distance of 10 miles. A *white* riding light is exhibited from the fore-stay, 6 feet above the rail. The light-vessel, painted red, with the word *Taku* in white letters on her sides, has one mast carrying an 8-feet black ball. Position approximate, lat. $38^{\circ} 53' 0''$ N., long. $117^{\circ} 50' 30''$ E.

Fog-Signal.—During foggy weather a gong will be sounded at intervals of one minute.

Note.—Should the light-vessel be driven from her position to one where she is of no use as a guide to shipping, the usual light will not be exhibited, but an ordinary red light will be shown at each end of the vessel—the ball will be struck as soon as possible, and until struck a red flag will be hoisted above it. *Variation*, $2\frac{1}{2}^{\circ}$ W.

22.—AUSTRALIA.—*East Coast*.—*Great Sandy Strait*.—*Southern Entrance*.—*Directions for Wide Bay Bar*.—Crossing the bar at

night, Hook point leading lights must be kept in line bearing W. by S., until Inskip point leading lights come in line, which should then be steered for, until a red light on Inskip point opens out. A vessel will then be clear of the spit extending south-eastward from Great Sandy island, and a mid-channel course should be steered until the lights on the west part of Inskip point are brought in line bearing S.E. $\frac{1}{2}$ E., which lead to the Fairway buoy off Snout point, when, if dark, anchor till daylight. *Variation*, $9\frac{1}{4}^{\circ}$ E.

23.—AUSTRALIA.—*East Coast.*—*Flat-top Island.*—*Directions for Inner Anchorage, approach to Pioneer River.*—Two beacons (white) have been placed on East point, which, kept in line lead clear of the reef extending northward of Flat-top island. Two similar beacons have also been placed on the south-west part of Flat-top island, which, kept in line lead westward of the reef off Flat-top island. Lights will be exhibited from these beacons, when necessary.

Directions by Day.—Intending to anchor westward of Flat-top island, bring the beacons on East point in line bearing W. $\frac{1}{2}$ S., and steer towards them until the beacons on Flat-top island come in line bearing S. $\frac{1}{2}$ E.; then alter course to S. by W. until Flat-top island lighthouse bears S.E.; a vessel can then anchor in not less than 18 feet at low water spring tides. Vessels of light draught may anchor closer in, where better shelter is afforded during south-easterly gales.

By Night.—Steer in with the two lights on East point in line, until a light on the south-west part of Flat-top island opens out—then proceed as above directed. *Variation*, $7\frac{3}{4}^{\circ}$ E.

24.—AUSTRALIA.—*South Coast.*—*Port Philip Entrance.*—*Point Lonsdale and Swan Spit Red Lights Deepened in Colour.*—On 1st September, 1880, the colour of the red light at point Lonsdale was deepened to a darker red than previously shown, between the bearings of W. by N. and W. by S.; also the colour of Swan spit red light was deepened between the bearings of N.W. and S.W. by W. This deepening of colour is made to prevent the possibility of mistaking these lights for the Pile light in the south channel, when navigating the Eastern entrance of the south channel. *Variation*, $8\frac{1}{4}^{\circ}$ E.

25.—SOUTH AUSTRALIA.—*Rivoli Bay, Beachport.*—During the

construction of the new jetty at Beachport, a *red* light will be exhibited from a pole about 18 feet above water level, on the north end of the T head.

26.—NEW ZEALAND.—*North Island.—West Coast.—Manukau Harbour.*—Beacons on South Head not available as Leading Mark.—As the beacons on South head, Manukau harbour have ceased to be a leading mark for the deepest water in the South channel, vessels must pay attention to the semaphore alone.

27.—PACIFIC COAST.—*United States.—California.—Change of Colour of Santa Cruz Light.*—On and after January 1, 1881, the light displayed from the tower on point Santa Cruz, at the entrance to Santa Cruz harbour, will be *fixed red*, instead of fixed white as formerly.

28.—UNITED STATES.—*Delaware.—Automatic Signal-Buoy off Overfalls Shoals.*—This signal-buoy, giving blasts of a whistle at short intervals, has been moored off the point of the Overfalls shoals, entrance to the Delaware bay, in $6\frac{1}{2}$ fathoms water. The buoy is painted red, with the figure 4 on it in white. From it, cape May lighthouse bears N.N.E. $\frac{1}{4}$ E.; cape Henlopen lighthouse, S.W. by W.; Delaware breakwater lighthouse, W.S.W. $\frac{1}{4}$ W.

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE
HYDROGRAPHIC OFFICE, ADMIRALTY, 1880.

No. 32.—SAILING DIRECTIONS FOR THE WEST COASTS OF FRANCE, SPAIN, AND PORTUGAL, notice 4. Spain:—buoyage of Cadiz harbour and approaches.

No. 33.—BLACK SEA PILOT, notice 1. Dangers near the western and southern shores of the Black sea.

No. 34.—PACIFIC OCEAN, notice 51. Information relating to reefs and dangers in the south-western Pacific.

No. 35.—MEDITERRANEAN PILOT, vol. III., notice 1. Information relating to ports and anchorages in the Adriatic, and eastward of cape Matapan.

No. 36.—SOUTH AMERICA PILOT, part II., notice 10. Information relating to Magellan strait and channels, leading northward therefrom to the gulf of Peñas.

OUR OFFICIAL LOG.

OFFICIAL INQUIRIES AT HOME, 1880.

763. *West of England*, s.s.; built at Seacombe, 1866; owned by Mr. S. Hough, of Liverpool; tonnage, 490; Someron to United Kingdom; sulphur ore; abandoned at sea, September 15, 1880, when loss of life ensued. Inquiry held at Liverpool, November 1, 1880, before Raffles, Stip. Mag.; Hight and Curling, N.A.; May, E.A. Loss occasioned by leak in engine-room.

765. *Iris*, s.s.; built at Glasgow, 1876; owned by Mr. A. Laird, of Glasgow; tonnage, 330; Morecambe to Londonderry; general cargo and passengers; stranded on the Mull of Galloway, September 26, 1880. Inquiry held at Londonderry, October 30, 1880, before Macleod, Judge; Beasley and Anderson, N.A. Accident caused by an error of judgment on the master's part, in steering too northerly a course, and making no allowance for tide. Certificate not dealt with; admonished to be more careful in future.

771. *Eureka*, schooner; built at New Glasgow, Prince Edward's Island, 1865; owned by G. Philpot and others; tonnage, 99; Limerick to Boulogne; oats; abandoned off Lizard Point, Oct. 23, 1880. Inquiry held at Dublin, November 13, 1880, before O'Donnell, Judge; Hight and Pickard, N.A. Abandonment premature; master in default; uncertificated.

775. *Bickley*, s.s.; built at Sunderland, 1877; owned by the Ulster Steamship Company, Limited; tonnage, 400; Barrow-in-Furness to Riga; pig. iron; stranded near Windan, Russia, September 8, 1880. Inquiry held at Belfast, November 13, 1880, before Plunkett, Stip. Mag.; Ward and Clarke, N.A. Master in default for continuing his course at full speed when in close proximity to land; but considering his high character, certificate not dealt with.

777. *Llanishen*, s.s.; built at Wallsend in 1875; owned by Messrs. Schlesinger and others; tonnage, 676; damaged by explosion whilst lying in dock at Cardiff. Inquiry held at Cardiff,

November 8, 1880, before Jones, Judge; Beasley and Anderson, N.A. Explosion due to defective ventilation and improper stowage of cargo, for which the owners were responsible, and they were ordered to pay £10 towards cost of inquiry.

779. *Plantagenet*, s.s.; built at Poplar, 1869; owned by Mr. J. Bacon, of Liverpool; tonnage, 531; Newport to Barcelona; coals; lost through striking on some object under water between Cape Palos and Hormigas Island, October 14, 1880. Inquiry held at Liverpool, November 14, 1880, before Raffles, Stip. Mag.; Parfitt and Curling, N.A. Casualty due to vessel striking some object under water, but what that object was there is no evidence to show. Master free from blame.

780. *Yanikale*; built at Whitby, 1854; owned by James Clark, of Aberdeen; tonnage, 298; Gefle to Gloucester; iron and deals; abandoned at sea, October 8, 1880. Inquiry held at Swansea, November 6, 1880, before Rothery, Wreck Commissioner; Forster and Clarke, N.A. Loss due to unseaworthy condition of the vessel; the defective stowage of her cargo; and to her being sent to sea short of provisions. Master responsible for taking her to sea; certificate cancelled. Owner responsible for state of the vessel; condemned to pay £150.

781. *St. Clair*, s.s.; built at Dumbarton, 1876; owned by Mr. A. Ross, of Glasgow; tonnage, 67; Glasgow to North Uist; general cargo; lost on Roan Bogha, off the island of Tyree, October 22, 1880. Inquiry held at Glasgow, November 12, 1880, before McCulloch and Cowan, J.P.; Ward and Murdoch, N.A. Mate in default for not keeping a proper look-out; admonished to be more careful.

782. *County of Denbigh*, barque; built at Sunderland, 1877; owned by Mr. W. Thomas; tonnage, 1,081; Astoria to Queens-town; wheat in bags; supposed to have foundered at sea. Inquiry held at Liverpool, November 11, 1880, before Rothery, Wreck Commissioner; Forster and Castle, N.A. Loss probably due to the vessel having encountered, whilst heavily laden, an unusually severe gale of wind.

783. *Hannah*, schooner, and *Shamrock*, s.s.; the former built at Sunderland, 1864; owned by Mr. R. Newton, of Carnarvon;

tonnage, 82; Liverpool to Yarmouth; salt; the latter built at Birkenhead, 1876; owned by London and North-Western railway company; tonnage, 401 *net*; Dublin to Holyhead; passengers; in collision off Holyhead, October 8, 1880, when loss of life ensued. Inquiry held at Holyhead, November 8, 1880, before Rothery, Wreck Commissioner; Pickard, Parfitt, and Harland, N.A. Collision due to the master of the *Hannah* not having exhibited a flare-up or light to the overtaking vessel; master of *Shamrock* free from blame.

785. *Margaret*, ship; built at New Brunswick, 1856; owned by Mr. S. Vaughan and others; tonnage, 965; Cardiff to Rio de Janeiro; coals; abandoned in the North Atlantic, October 17, 1880. Inquiry at Liverpool, November 18, 1880, before Raffles, Judge; Powell, Comyn, and Harland, N.A. Abandonment justifiable; loss due to stress of weather.

790. *Glewnore*, barquentine; built at Garmouth, 1858; owned by Mr. J. Lawson and others; tonnage, 233; Ornskoldsvik to Dartford; deals, &c.; lost on rocks in Gulf of Bothnia, September 29, 1880. Inquiry held at Greenwich, November 19, 1880, before Balguy, Stip. Mag.; Beasley and Anderson, N.A. Master to blame for neglecting to verify his position by taking bearings of the lights, and for leaving an incompetent person in charge; certificate suspended for six months.

792. *Marys*, brig; built at Dundee, 1849; owned by Mr. G. M. Martin; tonnage, 150; Liverpool to the Tyne; salt; lost on the Black Rock, Falmouth, October 22, 1880, when loss of life ensued. Inquiry held at Newcastle, November 16, 1880, before Rothery, Wreck Commissioner; Kennedy and Vaux, N.A. Master in default in the first place for not having the hold properly secured before taking in his cargo; and, secondly, in letting go his anchor too near the Black Rock. Severely reprimanded and warned to be more careful.

793. *Curlew*, schooner, and *Taunton*, ship; the former was built at Prince Edward's Island, 1865; owned by the Aberdeen Line Company; tonnage, 209; Aberdeen to London; stone; the latter built at Hartlepool, 1868; owned by Mr. W. Milburn and others; tonnage, 687; Havre to the Tyne; ballast; in

collision off Yarmouth Roads, October 2, 1880, when loss of life ensued. Inquiry held at Newcastle, November 15, 1880, before Rothery, Wreck Commissioner; Aplin, Kennedy, and Vaux, N.A. Master of the *Taunton* in default for neglecting to give way and go to leeward of the *Curlew*, that vessel being close-hauled on the starboard-tack, and he having his port-tacks on board.

795. *Blackpool*, barquentine; built at Deptford, Sunderland, 1873; owned by the Lancashire Shipping Company, Limited; tonnage, 290; Wilmington to Liverpool; resin, and deck load of timber; supposed to have foundered at sea. Inquiry held at Liverpool, November 25, 1880, before Raffles, Stip. Mag.; Grant, and Vaux, N.A. Casualty due to the vessel (apparently not in good condition) being overladen.

796. *Adina*, schooner; built at Paisley, 1878; owned by Messrs. Gillies, Reid and Co.; tonnage, 92; Glasgow to Exeter; coals; supposed to have foundered at sea. Inquiry held at Glasgow, November 22, 1880, before Rothery, Wreck Commissioner; Grant and Kennedy, N.A. Loss probably due to vessel being overladen.

800. *Times*, s.s.; built at Govan, 1851; owned by the Belfast Coasting Steamship Company, Limited; tonnage, 175; Swansea to Belfast; general cargo; stranded in Belfast Lough, October 28, 1880. Inquiry held at Belfast, November 25, 1880, before Clifford-Lloyd, Judge; Castle, Comyn, N.A., and Miller, E.A. Master and mate in default. Certificate of former suspended for three months, the latter reprimanded. The chief and second engineers were also to blame for being under the influence of drink at the time of the accident. Certificates suspended for three and six months respectively.

OFFICIAL INQUIRIES ABROAD.

759. *Our Own*, s.s.; lost on Bass Point. Inquiry held at Sydney, September 6, 1880. No evidence to support a charge against the master.

761. *Flavian*, s.s.; stranded at Great Island, Newfoundland. Inquiry held October 6, 1880. Accident due to error in compass. Master's certificate returned.

762. *Altcar*, barque; suffered considerable damage whilst at sea, and put into the nearest port. Inquiry held at Natal, July 24, 1880. Damage caused by the cargo having been re-stowed in Cape Town, when too much dead-weight appears to have been placed in the 'tween-decks.

764. *Birchvale*, barque; lost on Alguada Reef, August 14, 1880. Inquiry held at Bassein, August 25, 1880. Master in default. Certificate suspended for nine months.

766. *Natal*, barque; stranded on the Bar at Natal, July 25, 1880. Inquiry held at Natal. Accident due to want of power in the tug. No fault due to master.

767. *Dunkeld*, s.s.; stranded at Durban. Inquiry held at Durban, August 28, 1880. Stranding due to the narrowness of the Channel. Officers acquitted of blame.

768. *Zennia*, barque; parted cables and driven on the Bar Ridge, Natal, July 21, 1880. Inquiry held at Natal, August 10, 1880. Accident mainly due to more chain not having been given her when the swell began to roll into the harbour.

769. *Luna*, schooner; abandoned and lost. Inquiry held at Cape Town, August 23, 1880. Master in default for not beaching the vessel. Uncertificated.

770. *Bates Family*, ship; abandoned at sea, September 6, 1880. Inquiry held at Port Elizabeth, September 15, 1880. Loss due to tempestuous weather. Abandonment justifiable.

772. *Bay of Naples*; grounded in Rangoon River. Inquiry held at Rangoon, January 28, 1880. Vessel being in charge of pilot, no blame attributable to master.

773. *Kilwa*, s.s.; stranded. Inquiry held at Maulmein, August 6, 1880. No blame attached to master.

774. *Strathmore*, barque; abandoned at sea, September 4, 1880. Inquiry held at Cape Town, October 11, 1880. Master in default. Certificate suspended for twelve months.

776. *Lassa*, barque; lost on a sunken rock off Santopilly Lighthouse, August 4, 1880. Inquiry held at Bimlipatam,

September 11, 1880. Master guilty of negligence. Certificate not dealt with.

778. *British Empire*, barque; took fire in Rangoon River, April 22, 1880. Inquiry held at Rangoon, May 5, 1880. Accident caused by sparks going down ventilators, or from spontaneous combustion amongst rice cargo.

784. *David Law*, ship; lost by fire and abandoned, August 31, 1880. Inquiry held at the Falkland Islands, September 17, 1880. Fire originated in coal cargo. Abandonment justifiable.

786. *Harry Wood*, ketch; stranded on North Point Reef, August 3, 1880. Inquiry held at Stanley, September 1, 1880. Accident due to mate (uncertificated) steering a wrong course. Master free from blame.

787. *Kauri*, schooner; lost on Aha Aha Rock, Island of Waiheke, September 1, 1880. Inquiry held at Auckland, September 9, 1880. Master free from blame.

788. *Rangatira*, s.s.; lost on Peperel's Reef, off New Zealand coast, September 7, 1880. Inquiry held at New Plymouth, September 15, 1880. Master somewhat to blame; reprimanded. Chief mate guilty of gross carelessness. Certificate suspended for six months.

789. *Hinemoa*, s.s., and *Faiaroa*, s.s.; in collision in Mankan Harbour, August 31, 1880. Inquiry held at Wellington, N.Z., September 15, 1880. Both masters to blame, but as the damage done was slight, their certificates were not dealt with.

791. *Teutonia*, s.s.; damaged by fire, October 31, 1880. Naval Court held at New Orleans. Court found that the cotton on board was maliciously fired by some unknown person.

794. *Cartsburn*, ship; lost by fire, August 7, 1880. Inquiry held at Aden, September 4, 1880. Fire attributable to spontaneous combustion. Master acted with calmness and judgment.

801. *Ada*, schooner; stranded on Pajang reef. Inquiry held at Batavia. Master exonerated from blame.

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THE STABILITY OF THE "ATALANTA."

N the 5th June last a Committee was appointed by the Admiralty to inquire into the efficiency of the training-ship *Atalanta*, which left Bermuda for England on 1st February, 1880, and has not since been heard of. The Committee consisted of two Admirals, a Staff-Captain, the Wreck Commissioner, and the Secretary of Lloyd's Register, and they presented on the 22nd December last a unanimous report, abstracts of which have appeared in most of the daily papers. The appendices to the report, containing minutes of the evidence and various plans of the vessel, and correspondence respecting her, have only just been printed in a blue-book, and in the present paper we propose to consider chiefly that part of it relating to the stability of the ship. The Committee were instructed "to inquire into the efficiency of H.M.S. *Atalanta*, and to report to their Lordships whether that ship was sound, stable, and seaworthy when she left England for the West Indies in November, 1879; also whether her rigging, equipment, officers, and crew were in all respects sufficient and suitable to provide for her safety upon the service in which she was employed." When first built, and till recently, her name was the *Juno*. She was a 26-gun sailing-frigate, of 923 tons,

and was built at Pembroke, in 1844, after designs of the late Rear-Admiral Sir William Symonds, then Surveyor of the Navy. She served on the Pacific station for three years, was paid off in 1849, was again commissioned in 1853, and served four years on the Australian station. She was again laid up, and afterwards, from 1861 till 1877, did duty as a water-police vessel at Portsmouth. She was selected in the last-named year for employment as a training-ship, was repaired and fitted at Pembroke, in 1877-8, and was commissioned at Devonport, in September, 1878, by Captain Stirling, who retained the command till the last date at which we have any intelligence of her. After two cruises as a training-ship, she was repaired and refitted at Portsmouth, in 1879, leaving for the West Indies in November of that year. She left Bermuda to return to England on the 1st February, 1880, since which time nothing has been seen or heard of her.

The Committee divide their enquiry into seven parts:—soundness, stability, rigging, equipment, seaworthiness, officers, crew. The two last are out of the scope of the present article. *Seaworthiness* includes the whole question, and would almost appear out of place as a subordinate division of the report, its position in this respect being doubtless due to a literal rather than a logical interpretation of the instructions given to the Committee. There appears to have been no question about the *equipment*, and very little as to the efficiency of the *rigging*, except as regards its bearing upon the stability.

Doubts as to the soundness of the *Atalanta* appear to have been caused by the facts that she had been used as a hulk for water-police at Portsmouth, from 1861 till 1877, and that there had been some leakage on her homeward voyage in 1879. It appeared on evidence that she was used as a hulk, not because she was suspected of unsoundness, but that vessels of her class were found to be no longer of any use as ships of war. The repairs at Pembroke, after it was determined to fit her for a training-ship were very extensive, and we may add very expensive, costing altogether £27,182, including fittings. In the appendices to the report are given drawings showing all the timbers and planking of

the ship, and indicating by colours what was renewed. So much was done in this respect that it would appear to be impossible that any defects were left, certainly none so serious as to be a source of danger to the ship.

It has been the practice for some time past to fit bilge-keels to vessels in Her Majesty's Navy to diminish their rolling, and bilge-keels were fitted to the *Atalanta*, but they appear to have been placed so high that she occasionally rolled them out of the water, the consequence being that their fastenings were loosened, and hence the leakage. The bilge-keels were removed at the close of 1879, since which time nothing has been heard of the leakage. Other slight defects were noticed on the first cruise, which appear to have been remedied on her refit, and the Committee conclude that "when the *Atalanta* left England for the West Indies in November, 1879, she was a sound ship."

We now come to the main part of the question, upon which the Committee begin by stating that "all the witnesses who served in her, whether as a ship of war or as a training-ship, speak of her as a safe and stable ship; at the same time they all agree in saying that she lurched and rolled very deeply." Some space is taken up in analysing the evidence as to the amplitude of the rolling, it being stated in the official report of Captain Stirling (who commanded the vessel while she was employed as a training-ship and who was lost in her), that she lurched 40 degrees, and rolled to windward 25 degrees.

Whatever may be the fact as to the extent of the rolling it is well known that all Symondite ships roll considerably. It was attempted to diminish the extent of the rolling by bilge-keels, but the bilge-keels were placed too high up to be of much use and were in fact the cause of leakage. The Committee think that "it may well be a question whether it would not have been better to have placed them lower down after the first cruise, instead of removing them altogether, as they might have added to the easiness of the ship." The Committee then advert to the fact that in fitting the vessel for a training-ship at Pembroke her masts were shortened, and that after her first voyage as a training-ship other weights had been altered, four 64-pounder guns on the main-deck were removed

and two 9-pounders put on board on the upper-deck instead. Thirteen tons of additional ballast was also then put on board at the request of Captain Stirling. On the alteration thus caused in the centre of gravity as compared with the former state of things, the Committee thus remark:—"No doubt the shortening of the lower masts, the reduction of the armament, and the removal of the bilge-keels and the four 64-pounder guns, as well as the addition of the ballast and cement, would tend to increase the ship's uneasiness, by causing her to roll and lurch more deeply;" but the fact of the ship having lurched and rolled deeply is no proof that she was not a stable ship; on the contrary, taking Mr. Barnaby's definition "that the stability may be said to be the force with which she tends to right herself after she has been inclined, or resists inclination from any position in which she is;" it would seem that heavy lurching and rolling may be quite consistent with stability." They give the figures respecting the alterations as follows: "the centre of gravity of the *Atalanta* was lowered from what it had been in the *Juno* '75 of a foot, after her first cruise it was lowered $\cdot 1$ of a foot, and after her second cruise still further lowered $\cdot 1$ of a foot, making altogether $\cdot 95$ of a foot." These successive alterations increased the stability and consequently the lurching and rolling.

A curve of stability was furnished by the Admiralty, and the Committee arranged that one should be obtained by means of independent calculations, conducted by Mr. W. John, an Assistant to the Chief Surveyor at Lloyd's Registry. The former gave a range of stability up to 96 degrees, the latter to 85 degrees. They then observe that: "From a comparison of the *Atalanta's* curve of stability with those of well-designed merchant vessels, Mr. John was led to think that the vessel had an insufficient righting moment at large angles, and that it was by no means improbable that she would capsize if caught in a squall of wind, unless very skilfully handled." After remarking upon the differences in the qualifications of a vessel required for such service as the *Atalanta* from those necessary in a merchant vessel, they come to the conclusion that "she was on the whole a very stable ship, except at large angles of heel; that she was

more stable than when first commissioned as a training-ship ; and much more so than in her previous commissions as a man-of-war."

In connection with the *rigging*, a reference is made to the cases of four vessels of war—the *Raleigh*, *Racer*, *Star*, and *Junna*, which were thrown on their beam-ends, and righted after being relieved of their masts ; and it is explained that, provided the lanyards to the shrouds are of hemp, it is as easy to get rid of the masts in an emergency as if all the rigging were of hemp ; and under the head of *seaworthiness*, a further remark is made as follows :—" We may add that the four ships of war referred to, which righted after they had been thrown on their beam-ends, were flush-decked ships, and being battened down, very little water would get below, so long as the battening down held good. But with a frigate-built ship, such as the *Atalanta*, the case would be different ; once on her beam-ends, water would enter through the ports, skids, quarter-galleries, stern windows, and other places, which can never be made water-tight, in such quantities, that it would be only a question of time when she would fill. And although the *Atalanta's* skids were, we are told, filled in solid, the only result would be that it might give more time to cut away the lower rigging."

Such is the substance of the report of the Committee, so far as it refers to the *stability* of the vessel ; in the appendices to the report, are given the curves of the stability and some memoranda upon the general subject by the Constructors of the Navy, and also by Mr. John ; the former maintaining that although not the kind of ship they would design in the present day, the *Atalanta* was, in respect of her stability, a safe ship ; the latter, that she was not.

As there is an increasing disposition just at present to attribute the losses of vessels to deficient stability, it may be useful to consider at some length what has been said both for and against the stability of the *Atalanta*. In the case of merchant steamers lost within the last few years, the charge of instability has been made against vessels which, in every particular, are just what the *Atalanta* was not. The latter vessel had a peg-top shaped midship section, great beam in proportion to depth, and very fine ends ; missing steamers which have been the subject of much debate have, on the contrary, had a midship section almost a

rectangle, large depth in proportion to beam, and very full ends. A further contrast is found in the fact that the *Atalanta* had the exceptionally large metacentric height of 6 feet 2 inches; the steamers referred to were liable, when loaded with uniform cargo of small specific gravity (their most dangerous condition) to have a very small metacentric height, or, in other words, to be crank. The alleged source of danger in each case is, however, not the excess or want of stability in the upright position measured by metacentric height, but deficiency in range of stability. Range of stability was not thought of at all till about the time when the ill-fated H.M.S. *Captain* was built; it was shown conclusively in her case that a very limited range, although accompanied by a large initial stability, was, in connection with the fact that the vessel was kept under a large spread of sail in heavy weather, the cause of disaster.

Previous to that time, the initial stability, measured by the height of the metacentre above the centre of gravity in the upright position, was all that was deemed necessary in judging of a vessel's stability, but it was then at once seen that range of stability was also an important feature; and since that period, curves of stability have been regularly got out for every ship added to H.M. Navy, and for most of the vessels then belonging to it. As is usually the case, the new thing has had an exaggerated importance attached to it, and range of stability has been spoken of as if it alone were the criterion of safety. There is a conspicuous instance of this in a paper read before the Institution of Naval Architects last year, by the Chief Surveyor of Lloyd's Registry. He takes for illustration a steamer of the "three-deck type," such as we have just referred to, and shows that under certain conditions of loading her, the vanishing point of her stability would be only 51 degrees. This, with a cargo liable to shift, certainly gives but a small margin. The metacentric height was, however, only $\frac{1}{10}$ ths of a foot. When the same vessel, at the same immersion, is so loaded as to have her centre of gravity lowered six inches only, the range of stability is brought up to 76 degrees. The inference drawn from this is, that the vessel is of a bad form, and that it would be better if she was so designed as to have

a larger range of stability, the real truth being that the vicious feature of the case is the low initial stability shown by the small metacentric height, which, in a cargo liable to shift, would be a source of great danger, however large the range of stability.

We believe the questions that have arisen with regard to the *Atalanta* are due to a similar exaggeration of the importance of range, although in this case, the vessel is of a diametrically opposite type. The *Atalanta*, as we have said, had a large metacentric height, and this feature has been spoken of as a source of great danger to her, inasmuch as it caused her to roll to very large angles, and if a sudden squall struck her when inclined to a large angle, she would not have enough stability in that position to recover herself, but would capsize. Arguments for this view of the question, depend largely upon the known angles of rolling in former voyages of the ship, and would either take the form of comparisons of her conditions with those of other ships known to be unsafe, or deductions from the established science of naval architecture. Mr. John, in his evidence, makes the assumption that the vessel did roll to the extreme angle, stated by witnesses who had been in her on former voyages, and he adopts both lines of argument, thus coming by diverse roads to a conclusion condemnatory of the ship.

We have remarked that, the Committee in their report, do not accept without qualification the statements as to the vessel lurching 40 degrees to leeward, and rolling 20 degrees to windward. These figures were given in a report of Captain Stirling, and appear to have been put down after the matter was talked over with the officers. One of them, Lieutenant the Honourable A. Bethell, did not go in the vessel on her last voyage, and he tells us that the angle of inclination was ascertained by measuring the swing of a barometer which hung on a transverse bulkhead in the cabin. Many vessels of H.M. Navy have battens provided for taking observations of rolling by sighting the horizon, such was not the case with the *Atalanta*, and the only measurement was made by means of the rough pendulum we have described, which, of course, gave an utterly unreliable result. We are told, however, that the figures given as to the lurching and rolling, were confirmed

by the fact that the lee-nettings were sometimes in the water. Coming to details, it was stated by the same witness that this would occur at intervals of about half-an-hour when the ship was running before a heavy gale, thus clearly showing that what took place was, that a wave crest occasionally came in contact with the ship just as she was at an extreme lurch. This is obviously a different thing to a regular swing through an angle of over 60 degrees, upon which the conclusions condemnatory of the vessel are based. There is no doubt as to the vessel's rolling heavily, that might be expected, but nothing is more common than exaggeration when guesses are made as to angles of inclination. It is a common experience that the large majority of observers will over-estimate a ship's list, even when they are on shore, most of them will say it is double the true angle; it is not to be wondered at then that a ship's rolling at sea is similarly over-estimated.

In his evidence, Mr. John compared the *Atalanta* with the *Stuart Hahnemann*, a sailing ship of 4,000 tons, which capsized a few years ago, and whose stability he estimated in connection with the enquiry into her loss. This vessel was lost through too much sail having been carried, so much indeed as to keep her at a steady inclination of from 15 to 20 degrees, when a sudden squall capsized her. Mr. John stated that the *Stuart Hahnemann* had a range of stability of 81 degrees, and her metacentric height, as estimated by him, was 3·5 feet, the *Atalanta* having a range of 85 degrees with a metacentric height of 6 feet. The *Atalanta*, however, had 11·9 square feet area of plain sail per ton of displacement, whereas the other ship had but 6·6 square feet of plain sail.

The mere area of sail is nothing, and Mr. John compared, what he calls the "sail-carrying power" of the two vessels, by getting out curves showing this at various angles. At any given angle, the "sail-carrying power" is obtained by dividing the moment of stability at that angle by the moment of the sails about the centre of lateral resistance. This comparison told very much to the disadvantage of the *Atalanta*, even supposing her officers were not nearly as reckless as those of the *Stuart Hahnemann* were shown to be. It was however urged on the other side of the

question that, in the first place, the *Stuart Hahnemann's* curve of stability depends upon the assumption that her metacentric height was 3 feet 5 inches at the commencement of her voyage, and that the cargo did not shift, and it is pointed out that Mr. John, at Liverpool, in his evidence on the inquiry on the loss of the ship, put down her metacentric height at between 3 and $3\frac{1}{2}$ feet. For a height of 3 feet, her range of stability would become 75 degrees, and if it were only $2\frac{1}{2}$ feet, it would be but 69 degrees. Considerations of speed of the ship, direction of wind, and angle of heel, it is urged, point to a much smaller metacentric height than $3\frac{1}{2}$ feet, or else to a loss of righting moment due to shifting of cargo. It is further urged that a ship of 4,000 tons cannot fairly be compared to one of 1,000 as regards the relation of sail-power to displacement. On this point, Mr. Barnaby, the Director-General of Naval Construction, writes as follows:—

"In small vessels the areas and heights of the several sails are so moderate, that they are well under control; in large vessels they would not be if the proportion of sail carried were the same. . . . But Mr. John holds that stability should be made sufficient to enable vessels, whether small or large, to carry their sails with equal safety. If this means that the power to carry sail should be equal in ships of all sizes and weights, as it apparently does, we do not concur with Mr. John. The effect of such a rule would be that owners and captains of comparatively small vessels would be prevented from spreading the canvas which the experience of ages has shown to be of great value in light winds, and perfectly under control in dangerous weather."

Mr. John, however, as we said, came to the conclusion that the *Atalanta* was a dangerous ship, by a line of argument unconnected with any comparison with other vessels, and depending upon scientific considerations of the effect of wind-pressure and the rolling of ships at sea. In his investigation, he assumes the vessel to be rolling at the worst that has been said of her, and to have had all her plain sail set, and he further assumes that all the sail would be in a fore-and-aft plane. We have not space to go into this part of the question at length; it does strike us, however, that too much is made of the area of *plain* sail. If, as in the case

of the *Stuart Hahnemann*, we know for certain what sail was carried under known circumstances, it may be possible to estimate its effect in capsizing her; but to take the mere area of plain sail and use it in a mathematical investigation, and treat it as a fixed quantity like the moment of stability, is to introduce a very questionable element. The skilled navigator does not trust for the safety of his ship to the carrying away of all the light sail, and does not expect her to stand up always under the plain sail, the notion so put is, of course, absurd, and yet this view of the case is one of the bases of the so-called scientific treatment of the question.

On the question as to wind-pressure and sail area, with regard to rolling, the Constructors of the Navy remark, as follows:—

"No one has yet put forward a complete or satisfactory method of dealing with the question of the safety of rigged ships rolling in a sea-way with sail set." And, further, they say that "Mr. John's opinion is necessarily speculative, since it is impossible, in the present state of our knowledge, to fully represent all the conditions of the problem." We quote, further, the conclusion of their final memorandum upon the subject: "There is no dispute as to the statement of the Constructors, that changes made in the refit of the ship tended to an increase in her sail-carrying power and stability as compared with her when called the *Juno*. We, therefore, conclude that any probability that the *Atalanta* might be capsized in a squall, attached to the *Juno* during her periods of service with greater force. Mr. John still thinks it probable that she was so capsized. We are not able to say that she could not have been. We can go no further than to claim the right to conclude that, with equally experienced and careful seamanship, she was more secure against such an accident than the *Juno* and her sisters had been in their service at sea, and none of them had been lost, nor were they so unlike other war ships of their size and of their day, as to be unable to benefit by the argument derivable from the security of ships in long and arduous service under sail."

We have thought it desirable to place before our readers at some length, the arguments for and against the seaworthiness of the

Atalanta, because the same line of reasoning that was made use of against her, would condemn numbers of other vessels which have done and will do good service. Stability may be secured by keeping the weights low in a ship, or may be provided for by her form, that is, by giving her large beam and fineness below water. In the latter case, there is likely to be a much smaller range of stability than in the former, for the simple reason, that the freeboard being the same, the greater the beam, the smaller the angle at which the edge of the deck is put under water.*

Ironclads, of necessity, have their weights high, and depend for their stability upon their great beam; they would have much larger ranges of stability if the circumstances of the case admitted of the weights being lower and the beam less. The same may be also said of many small unarmoured ships of war which have to carry very heavy guns on the upper-deck, and with which light draught is an important desideratum. Curves of stability of a number of high-class large sailing vessels were put in evidence, to show that a large range of stability is a feature of well-designed merchant ships. We believe this is the case with many vessels, and we further believe that there is so much diversity in the very large number of vessels belonging to our Mercantile Marine, that almost anything could be proved by a similar process. There is certainly a most useful class of vessels which depend for their stability upon beam, we mean the vessels known and prized as "poor men's ships," because they will shift without ballast.

The range of stability of these vessels is very moderate, but

* It was this consideration which induced the Council of the Institution of Naval Architects, some years ago, to recommend a rule of freeboard, depending chiefly upon the beam of the ship, as follows:—"One-eighth of the beam is a minimum freeboard for ordinary sea-going ships, of not more than five breadths to length, and one thirty-second of the beam should further be added to the freeboard for each additional breadth in the length of the ship." The absurdity of this rule is now so patent that it is never quoted except to be ridiculed, and yet so far as it goes, it rests upon a sound scientific basis. It errs in taking in only one element of the question, and excluding others of as much, or more importance. It provides only for range of stability.

experience has proved it to be sufficient; they could easily be condemned by the same process that has been applied to the *Atalanta*. The truth is, that the design of every ship, whether for war or commerce, is a balance of advantages, if one good quality is in excess it is usually at the sacrifice of some other. No such paragon of a ship has been yet produced as to be capable of defying alike the perils of the sea and the consequences of lack of seamanship on the part of her commander. If any class of vessels is to be condemned as unseaworthy from one experience, or even three or four experiences of loss, after thousands of instances of successful voyages, by the same process, all ships afloat would sooner or later be condemned.

It may not be out of place for us, in conclusion, to devote a small space to the consideration of the general subject of training-ships for the Navy. From the evidence of more than one officer of high rank it would appear that sea training in sailing ships is much needed both by officers and men. Sir Thomas Symonds, the Admiral of the Fleet, in answer to a question in reference to the training of officers said:—"I do not think that the poor young men of the present day have much opportunity of learning. It is not their fault, but I do not give them credit for much knowledge of handling a sea-going sailing ship. It is not natural that they should know much about it," and the Committee in their report say: "It seems that young officers may now pass out of the *Britannia* school-ship into one ironclad after another, until they attain the age of nineteen years, when, in the words of a lieutenant's passing certificate, they are declared 'fit to take charge of and perform the responsible duties of officers of a watch on board any of Her Majesty's ships,' and yet they may never have had the opportunity of assisting to handle a ship under sail alone in heavy weather, and all their knowledge of this important branch of seamanship may have been derived, not from practical experience, but from books and lectures," Of course, many other things than experience in handling a ship under sail are required of an officer in H.M. Navy, but it is of the utmost importance that any officer in charge of a ship should possess, amongst other qualifications, the knowledge and experience

requisite to enable him to sail his vessel in the event of her machinery being disabled. Officers of the Mercantile Marine acquire this knowledge by serving in sailing ships, and there gaining the experience necessary to pass as masters, it being recognised that such experience cannot be obtained in a steamer. The Admiralty have now no sailing ships of war, that is no vessels which must perforce be dependent on sail alone; under these circumstances, we would suggest the desirability of their making arrangements for the officers of the Royal Navy to obtain their sailing experience in sailing ships of the Mercantile Marine. Experience of this kind would be more valuable than any which could possibly be obtained in a crowded, over-manned sailing training-ship. An arrangement of this character, if practicable, would tend to draw closer the officers of the Royal and Mercantile Navies of England, and be an onward step in the direction indicated in this Journal, of August last (page 635, vol. 1880), and, in addition, would be a further development of the movements recently made by the Admiralty in the direction of making the Mercantile Marine available as a reserve in the event of war.

THE "ATALANTA" INQUIRY.

HE report of the *Atalanta* Committee fails to throw any additional light on the cause of her loss; and all who are familiar with such incidents will not feel surprise at the result of the investigation. It was stated in the June number of the *Nautical Magazine* that it was possible some brave man had, at the closing scene, committed a record to the care of the waves; if so, it may yet turn up; but the secrets of the North Atlantic are closely kept, notwithstanding the vast traffic passing over it in every direction throughout the year.

The writer's maternal grandfather foundered off the coast of Massachusetts, the 21st of October, 1777. On that night his young wife was at a ball; her wedding ring broke, and accepting

it as an evil omen, she immediately left the room. To extreme old age the hope of his return never deserted her, burning as brightly after the lapse of sixty years as it did in youth.

The most important feature in this investigation arises from the fact that for the first time in naval jurisprudence, Parliament and the general voice of the country insisted on the presence of the civilian element, notwithstanding the objections which officers of the old school raised against the innovation. It is unnecessary to dwell on the qualifications of the two able men who thus represented the public, for their names are household words. Neither is it necessary to touch on the incidents which apparently led up to this change; but whatever it was, the precedent will not be lost sight of by the public or the Navy.

There is yet another feature in connection with this inquiry which may be worthy of attention. Staff-Captain Batt has, it is presumed, for his special qualifications and high standing in the Navy, been selected to sit as a member of two of the most important maritime and judicial committees ever held in this country. That he has performed the duties attached to them conscientiously and well has not been questioned. But when Captain Batt returns to his post, or to any held by an officer of similar rank, he is junior on active service to a lieutenant of nineteen, and ineligible to sit as a member of a court martial, although his nominal junior, but real superior, the lieutenant, can, and does. Quite recently, glaring instances of the effects of this inconsistency have appeared in the naval press. Neither civilians nor foreigners can understand this singular anomaly, although successive administrations of naval lords evidently deem the custom logical and consistent. It is much to be desired that this peculiar regulation may attract the attention of the enlightened nobleman who now guides the naval destinies of the country at Whitehall, as well as that of the deservedly popular first sea lord.

The *Atalanta* was, apparently, when she left on her last cruise, seaworthy in hull, equipments, and personnel; but there are certain questions on the point, in connection with the report, on which additional information would have been desirable. For example, it is stated that if thrown on her beam-ends,

water would flow in through the ports and other places which cannot be made tight. Why not? If the rabbets are of a sufficient width, and properly felted and greased, they are practically hermetically sealed. It is a point of seamanship with careful officers to see these precautions, as far as circumstances will admit, carried out systematically. The dockyard authorities are rather skimping on the depth of rabbets, as an examination of them will, in many instances, prove. What was the depth of those of the *Atalanta*? what was the thickness of her ports? of what material were they constructed? and what was their age? Were they, after being secured, tested by a fire-hose playing on them? and if not, why not? Again, as the skids were filled in solid, the deck would only present the ordinary hatchways, and to ask if they were properly fitted for battening down would appear unreasonable. Through what openings, then, could the water get below in a greater degree than in an ordinary ship, if proper precautions were taken in bad weather to secure the quarter-galleries? All these factors bear on the case.

The placing of the bilge-pieces so that they would be out of the water at an inclination of 25° in a smooth sea, was, to say the least, a singular provision to ease a ship whose alleged rolls are recorded as high as 40° , and even 45° . It was unfortunate, because after their removal, the lurching was apparently increased. The arc of rolling does not appear to have been recorded by any reliable instruments. Why were none on board if correct observations are of value? and if they are not, why dwell on them at all? The alleged loosening of the bolts which secured the bilge-pieces, and the leak caused thereby, induces mechanical men to ask if they were fayed close home to the timbers, coked and caulked in with the planking, or were they put on *overall*. It scarcely seems possible that the latter plan was adopted, but if not, how was it that the slackbolts were able to retain the logs in place, or what prevented the latter from working out bodily, after they had once started, and compromising the safety of the ship? The safest bilge logs are in two lengths—in fact, shoed. Seamen who have been driving across the Atlantic in winter, will smile when they read that the swing of a barometer to leeward was

assumed to measure the angle of heel pretty closely to the truth. According to this theory, when a ship nearly five hundred feet long, jerks a lamp to the deck from which it is suspended, the angle of pitch or scend must be 90° . If the measurement is approximately correct in one direction, why not in the other?

The number of rolls recorded of the *Atalanta* per minute is not much in advance of that of many other classes of Her Majesty's ships, notably, some of the corvettes and sloops, although the arc was certainly in excess of any now in commission.

The Committee state that additional ballast would have increased the stability, but at the same time would have increased the rolling. Both premises are unquestionably true. It is, however, yet to be proved that the stability was practically or theoretically deficient, notwithstanding the positivism which has been shown on the theory. Could it have been satisfactorily demonstrated, the report of the Committee would have cleared up what must now remain a mystery. If seamanship has not absolutely departed from the officers of the Navy, the assumption that they would allow a violent squall in the month of February to strike the ship under all sail, without their taking the necessary precautions to guard against its effects, is incredible. It is assumed that the calculations of Mr. John are based on this data, and that the wind pressure is calculated at the force it would strike the sails, with the yards braced fore-and-aft. No one will question the possibility of a catastrophe with such conditions if everything *held on*, but the experience of thirty years proves that in practice they are not to be entertained, unless the high professional reputation enjoyed by Captain Stirling and his officers is undeserved. If the log-books of his former cruises were examined, nightly entries of reefing and furling will certainly be found when cruising in suspicious latitudes. Captains always sleep the sounder for such precautions, and in the case of the *Atalanta*, we have no proof that they were neglected; indeed, everything indicates that the reverse was the case—"the captain was sleepless."

What is the explanation of the paragraph: "she would capsize if caught in a squall of wind, unless very skilfully handled"? By a well known mechanical law, the impact of a force suddenly

applied is doubled. With this fact in view, it is evident that the greatest danger of capsizing arises before seamanship can be utilised. If a ship recovers herself after the first shock, natural causes come into play to aid the crew. The force of the wind on the sails is lessened by the angle of inclination of the hull, upper masts and sails may go, or the latter be lowered, supposing that the ordinary precaution of keeping hands by the upper halyards had not been neglected. In a ship whose special mission was the training of young ordinary seamen, such negligence would be impossible. A great diversity of opinion existed between the witnesses, where there ought to have been none, as to the wedging of the masts, one set asserting that they were wedged on the upper-deck, and the other that they were not. It is the custom to wedge the masts of men-of-war on every deck, theory and practice proving the correctness of the system. In merchant ships they are seldom wedged in the upper-partners, consequently dismasting is not unfrequent, owing to the inferior length of the short arm of the lever, and want of proper steadying. Two remarkable examples of these methods came under the notice of the writer. One was on board a splendid new iron sailing ship, of 1,785 tons register, and the second, one of Her Majesty's ironclad frigates. The main-mast of the first being unwedged on the upper-deck broke in the main-deck partners, dragging the fore-mast and mizen top-mast with it. (When she was remasted, *all were well wedged as men-of-war are.*) In a revolving gale on the Atlantic, Her Majesty's ship washed away the fore and main channels, the dockyard authorities having refused to box them in. Yet, although the arcs of roll and lurch were recorded at 37° and 33° respectively, the masts stood, till the writer's gallant friend, Nicholson, had secured them, as only a sailor could do, in that cauldron of a sea, "with the lee-rail dipping in the water more than once in every half-hour." Had the upper-deck wedges been out, one of two events would have been certain, either the mast must have broken off at the main-deck and opened up the ship, or it must have been scored with a cold chisel on the upper-deck, and thus let go free.

The Court express their satisfaction at the number and status of the crew, in language similar to that of the author of the article in

the June number of the *Nautical Magazine*. It may be said that many of their conclusions differ but little, if at all, from what is there expressed. In the last paragraph of the report this is very marked, except in two additional suggestions which, be it said with all deference, will not bear investigation. How could the ship strike an iceberg on the sailing track from Bermuda to the Lizard? or what would be stranger still, how could she run on a rock when beyond the outlying reefs of the islands from which she had sailed?

So far as is generally known, no one has hinted that she did, until it was authoritatively published in the official report, as one amongst the many suggestions of her probable disappearance. There are so many dangers on the Atlantic in the track of ships, as to render hypothetical ones unnecessary to account for the disappearance of a fleet. What records are there of the missing thirty vessels alluded to in the report?

One paragraph appears to have puzzled all classes of readers. After stating that the frigate was seaworthy, it is added that her stability at large angles was not satisfactory. Now, as it is admitted by every one, that she rolled or lurched to very large angles, how could these peculiarities exist, without in some measure, on the Committee's own showing, compromising her safety under exceptional circumstances of sea and swell.

Officers who have sailed in frigates of this class, always speak of them with admiration, and will be slow to impute her loss to accidents similar to that of the *Heron* and other brigs. The *Heron*, according to a narrative the writer heard many years since from a survivor, was upset in a tornado off St. Thomas's Island, by reason of her running rigging being hung in the centipedes, consequently, when the squall took her aback with all the hatches off, there was not a chance of escape. The *Sappho* and *Nerbudda*, without doubt, foundered during one of those heavy gales which sweep the neighbourhood of the Cape, or they might have been taken aback in a sudden shift of wind with the boom and square main-sails set. Neither of these brigs can be compared to the *Atalanta*, with her high freeboard, reduced spars, and last, but not least, a clear upper-deck to manœuvre on, no mean advantage

with a full crew. Our brigs were boxes of guns, with bulwarks so high that, in an unusually heavy gale there was always a risk of swamping. Doubtless, the splendid seamanship of the officers and crew lessened this danger, but they could not avert it in exceptionally heavy weather. Notwithstanding these disadvantages, they were immense favourites with all classes of officers and men. A popular commander could man one in a few hours, and even some of those officers, who, by their actions, appeared to be specially commissioned to make men miserable, attracted crews, when none were forthcoming for a larger type of ship.

It is permissible in a magazine article to ramble from the main question into collateral branches of the same subject. A few of the above class are still wandering about the clubs, and their remarks and feelings on the proposed abolition of flogging in the service will induce them to infer that the death knell of discipline has been sounded and that the service is really going to the d——l at last. They may, however, take consolation from the fact that the Stewarts, the Keys, and the Pateys, a quarter of a century since, ruled the rough uneducated spirits of that day without recourse to the lash. It would have been well for the reputation of many had they followed so laudable an example, but they chose to adopt the course of men in brief authority, so long as their short-lived power endured, in place of moral force. The cat may have kept an extreme ruffian in order, but certainly at the expense of his constitution. How far such a system is in accordance with those principles of justice which we owe to our fellow men, let those who resorted to it prove. After the lapse of years the dull thud of punishment still rings in one's ears, resembling nothing but the crushing of the human frame by a fall from aloft.

Portions of the evidence are very bewildering to seamen. It is gravely stated by an important witness that once in every half-hour the lee hammock-netting was dipped in the water. Had he ever had the good or bad fortune to scud under bare poles off either Cape with a cargo of salt or copper-ore he might have witnessed a similar phenomenon every few seconds. Had he been hove-to under the same circumstances, the lurches might have been measured by the ratlines of the main rigging athwart

the crests of the huge waves as they rolled from under the bottom. Naval officers, as a body, now see so little of real sea service that a few glimpses of its stern realities make them garrulous on the subject. It would be interesting to note how many years each had actually spent with the topsail-sheets home, and how many in snug berths on shore or in port. The character of a ship ought not to be lightly taken away simply because she is missing, for the reputation of many individuals, the dead and the living, are inseparably bound up with her fate. It traduces the dead, who can no longer defend or explain away acts which are imputed to their ignorance, their negligence, or their credulity, and the living suffer in consequence. Not that death should bury in oblivion the crimes or blunders of men who have been the enemies of their kind, for it is wise to hold up the errors of the dead, in order that they may furnish beacons to the living.

It is painful to read the unfair criticism that has been published on the vessel. Any story which tended to criminate the Admiralty or the dockyard authorities was eagerly seized and amplified to suit the occasion. Correspondents interviewed everyone who had been directly or indirectly connected with her, and many whose professional knowledge would not enable them to decide on the qualities of a wherry were ready to pronounce the *Atalanta* unseaworthy. How was it that the sailors of the old school failed to detect these dangerous qualities? It is remarkable that since science has enabled us to calculate with accuracy the curve of stability of any particular ship, her risk of oversetting has increased in proportion. An Admiral who was examined stated clearly that seamanship, so far as sail-power was concerned, had retrograded. He did not point out in what manner a people, who are dependent on their seamen for their political and national existence, had, in war ships, supplied its place. Merchants, with a keener sense of the training necessary for the commanders and officers of their Leviathan steamships generally decline to allow anyone to rise above the grade of third officer, unless he has actually been master of a sailing ship. The Committee very wisely, and very delicately, touched on this important theme, and it becomes a question whether a similar method of

training, consistent with the requirements of a different service, should not be adopted by the Admiralty. Seamanship is now often learned by rote from the various manuals which professional officers have specially published for the purpose, thus enabling a clever youth, with the aid of a retentive memory, to answer the rather set questions of his examiners. It is a matter of notoriety that the best officers do not always carry off the highest class of certificates in this branch of their education. If anyone answers according to Boyd or Nares it is generally deemed sufficient; he masts a ship who has never seen a girtline rove. Seamanship proper cannot be learned from any book. It must be learned on the topsail-yard, at the wheel, on a lee-shore, from the surface of the ocean, and the sky above us. You can no more make a Nelson by sending a boy to the *Britannia* than a Vandyke by apprenticing him to an artist. The feeling is innate, and it is not an encouraging sign to a nation that lives by the sea, to find the rising generation avoiding an element to which their fathers took as naturally as ducks to the water. As the old lieutenant said half a century since: "the sea was bread, and often d——d hard bread too." But it was seamanship that enabled Nelson, at the Nile, to discern with unfailing correctness that where there was room for an enemy's ship to swing, there was room for one of his to anchor. It was seamanship that enabled him, at Trafalgar, to perceive that, by breaking and doubling on the French and Spanish lines, he could attack them in detail. It was seamanship that induced Hawke to say to the pilot who warned him of the danger of chasing the French fleet on the lee-shore of the ironbound coast of Brittany: "You have done your duty, leave the rest to me;" and it was seamanship that enabled generations of English admirals to raise that fame which is the glory of our nation.

It was alleged at the commencement of this paper, that the appointment of civilians to sit on the *Atalanta* Committee had given great offence to naval officers of the old school, some of whom ventilated the grievance in the *Times*. A counter-charge, with stronger reasons to support it, has been brought by the representatives of the merchant service against the Navy, to the agitation the latter have organised to secure the appoint-

ments of Nautical Assessors. No comments will be made in this article on the fitness, or otherwise, of the Naval officer to sit as a judge on cases for which he has had no special training. However, their action, whether it prove successful or not, will tend to widen the breach between the respective services to an unlimited degree; those who are intimately acquainted with the working of both, cannot but admit that the merchant officer is the injured party. But when members of a noble profession endeavour to keep the lion's share of honours and emoluments from their less favoured brother mariners, they must expect but scant courtesy from outsiders. Why had not the able officers of the Black Sea merchant fleet the medal conferred on them for the very good services they rendered throughout the campaign, when scores of naval men who never saw a shot fired in anger had? If the Navy really desire to meet the sister service on equal terms, the tactics of the future must be very different from the tactics of the past. The officers of the latter may, however, take comfort from the fact that they do not sit alone under the shadow of the Upas tree of official neglect and indifference. The Victoria Cross has been established for more than a quarter of a century, the Albert Medal for about half that time, yet in all those years not a single officer outside the ranks of the senior executive has been decorated with either of these much coveted distinctions. Are the officers to whom Her Majesty entrusted their distribution prepared to assert that brave acts appertain to only one branch of the nation's Navy, or were there more significant reasons for this reticence?

It is satisfactory to feel assured that, with a few exceptions, more liberal sentiments now rule the great departments. They are, however, unable to alter the past, and we, who appertain to it, must rest satisfied with having paved a track for our successors to tread in. They may rest assured that by steadily and consistently following it, their just claims will meet with the consideration which a selfish policy of exclusion denied to their fathers. For this they have to thank the press and that innate feeling of justice which dwells in the breasts of their countrymen.

W.

HYDROGRAPHICAL SURVEYS.

REPORT by Captain F. J. O. Evans, R.N., C.B., F.R.S., Hydrographer of the Navy, of the work performed under the direction of the Lords Commissioners of the Admiralty during the year 1879, in the examination and charting of the seaboard in various parts of the globe. (Parliamentary paper No. 9, session 1881.)

The steamships of war employed on surveying duties abroad during the past year have been the *Alert*, *Maggie*, *Fawn*, and *Sylvia*, with a hired steam-vessel on the coast of Newfoundland; and, until December last, another on the coast of Queensland. Small but serviceable schooners have been employed in the West Indies, South Australia, Fiji, and the islands of the Western Pacific; another of these useful vessels is on her way to Western Australia. On the Home Station there are two steam-vessels, one a sloop of war, and the other hired. Altogether the number of officers of all ranks employed in these vessels is 72, and the crews 600.

The surveying parties engaged on the coasts of the United Kingdom in Her Majesty's ship *Porcupine*, and the hired steam-vessel *Knight Errant*, under Staff-Captain Parsons and Staff-Commander George Stanley, have been actively employed; the former re-surveying the Solent Channel, the shoals off Saint Helen's in the Isle of Wight, as also the bar of Portsmouth Harbour, and that of Salcombe River on the Devonshire coast. Plans of the anchorages at Lynmouth, Minehead, Watchet, Porlock, Morte Bay, and at Lundy Island, all in the Bristol Channel, were executed by Staff-Commander Stanley. Both vessels, in the finer part of the somewhat exceptionally stormy summer season of 1879, ran several sectional lines of soundings across the English Channel, as also at the entrance of the Bristol Channel, in order to verify and amend the soundings of existing charts; many of these recorded depths being not only of an early, but of an uncertain date. This service is being continued, with special attention to accuracy of detail, not only in the interests of modern navigation but as reliable data for future reference.

On foreign surveys, the disposal of Her Majesty's ships has been as follows : *Fawn*, employed in the Sea of Marmara ; *Maggie*, on the coasts of China ; *Sylvia*, on the coasts of Japan ; *Alert*, in the inner navigable channels between Magellan Strait and the Gulf of Penas ; *Sparrowhawk* (schooner), at Jamaica ; *Alacrity* (schooner), Fiji group.

Surveying parties, in hired vessels, have been employed on the coasts of Newfoundland and Labrador, as also in Queensland, South Australia, and Western Australia.

In the Sea of Marmara, Captain Wharton and his assistants in the *Fawn*, have made considerable progress. From Erekli on the north, eastward to the Gulf of Ismid, and thence westward to Mudania Bay and Papa Island, the shores with their adjacent soundings have been admirably charted, on scales varying from one to six inches to the sea mile, and a comprehensive triangulation thrown over the whole sea. The completion of this work may be expected in the autumn of the present year.

On the seaboard of China, Captain Napier and his staff in the *Maggie*, visiting the Gulf of Tong King and Hainan Island, have surveyed the Treaty-ports of Pak-hoi and Hoi-how ; determined the position of Guie Chau Island and Cape Cami, including a partial examination of the shoal ground off this headland. Proceeding northward, an extended search for the Actæon shoal was instituted ;—this reported danger in the neighbourhood of the Shantung promontory, and lying in the highway of navigation for ships proceeding to the Gulf of Pechili, having long perplexed seamen ;—the search, however, was not successful. A comprehensive survey of the entrance of the Yangtze kiang, extending from Shaweishan Island and the Tungsha banks as a seaward boundary, upwards to Bush Island above the Wusung River, including enlarged plans of the outer and inner bars of this river, is also nearly completed.

In Japan, Commander Aldrich and staff in the *Sylvia*, have completed the Goto Islands ; also the west coast of Kiusiu from Da Sima to Odimari Bay, including the Kosiki group and the off-lying islands from the western part of Van Diemen Strait. A preparatory triangulation of the coast from Odimari Bay to Cape

Cochrane on the east coast of Kiusiu has also been made. The charts of the seaward approaches to Western Japan from the ports of China are thus approaching a satisfactory completion.

After six years' service on the coasts of Japan, the *Sylvia* will return to England in the autumn of this year. Her Majesty's ship *Flying Fish*, an armed sloop, of modern type, will take her place, under the command of Lieutenant R. F. Hoskyn, this officer having taken an active part in the surveying duties on which the *Sylvia* was engaged during the whole of her foreign service.

On the western coast of South America, Her Majesty's ship *Alert*, with an efficient staff of surveyors—in the early part of the year under Sir George Nares, and subsequently under Captain Maclear—has been employed on arduous service, chiefly in a critical examination of the ship channels adjacent to the 50th parallel of latitude. Trinidad Channel—directly opening into the Pacific Ocean—with Conception Channel leading from the inner waters north of Magellan Strait into Trinidad Channel have all been surveyed, together with their numerous ports and temporary anchorages likely to be useful to passing shipping. Innocentes Channel, leading to Conception Channel from the now well-known Guia narrows, has also been examined and charted.

Trinidad Channel opens out a clear passage to the Pacific Ocean 160 miles to the north of Magellan Strait; and although not so secure of approach from the Pacific as the well-known entrance into that strait by Cape Pillar and the Evangelists, it will be found a valuable addition to our knowledge of these waters, as enabling ships passing into the Pacific to avoid the heavy sea frequently experienced in the higher south latitude. Similar in feature to Magellan Strait, the ocean entrance of Trinidad Channel is shoal, having only 40 fathoms water in the deepest part, the depths gradually increasing to 300 fathoms in the inner channels. The southern shores are bounded by bold, rugged mountains, rising abruptly from the sea; whilst on the northern side a low wooded country lies between the sea and the rugged spurs of distant snow-clad mountains; both shores are cut up into numerous bays and inlets. In the latter months of the year very few natives were seen; it is understood that at this season the Fuegians

leave the inner waters for the outer seaboard, in pursuit of seals.

During the winter months, the *Alert*, having refitted at Coquimbo, then visited St. Felix and St. Ambrose islands, and obtained a series of ocean soundings in an area unexplored by the *Challenger*, in 1875. These islands appear to be unconnected with the South American continent, for soundings obtained midway gave a depth of 2,250 fathoms (rad. ooze), with a bottom temperature of 30°·5 F., both depth and temperature thus corresponding to the general bed of the South Pacific Ocean. Neither do they join the Juan Fernandez group, for the depths between reached 2,000 fathoms. These several scattered islands thus appear to rise from a submarine plateau as isolated mountains. Captain Maclear describes St. Ambrose Island as volcanic, composed entirely of lava aranged in horizontal strata very marked, intersected vertically by dykes of basalt; vegetation is scant, and the island is without water; though frequented by sea birds, the sides are too steep and rugged for guano to collect.

Jamaica.—The survey of the northern shores from Falmouth Harbour to Morant Point has been completed during the past year in the *Sparrowhawk*, by Lieutenant Pullen and his assistants, together with well-sounded plans of the several intermediate ports; these will doubtless prove of value to steam shipping engaged in local traffic. The seaboard of Jamaica, with an examination of the adjacent bank of soundings extending to 100 fathoms, is now completed, and the part recently surveyed preparing for the engraver.

Newfoundland and Labrador.—Staff-Commander Maxwell, with his two assistants in the hired steam-vessel *Gulnare*, has made good progress in the survey of the shores of Notre Dame Bay. In addition, several sectional lines of soundings have been run between the north-western shores of Newfoundland and the opposite Labrador coast, in aid of navigation in the thick and foggy weather prevalent in this region. Advantage was taken of a brief period of fine weather in the summer months for a close examination of that part of the Great Newfoundland Bank, on which the Virgin Rocks and what is known as their eastern shoals crop up (from

moderate depths of 30 to 35 fathoms) into knolls carrying in places as little as 3½ to 5 fathoms. The depths of even 9 fathoms on the eastern shoals are dangerous at times to shipping, from the turbulent sea produced in their neighbourhood in bad weather.

Both the absolute position and the configuration of these dangerous spots may now be relied on. Staff-Commander Maxwell in this examination cleared away many doubtful shoal soundings which had found place on the charts.

Australia.—In Western Australia, Staff-Commander Archdeacon and Navigating-Lieutenant Tooker have completed the coast-line eastward of King George Sound to the meridian of 120° east longitude; this includes the Mary Ann River near the east Mount Barren of Flinders. This active party will now be aided by a schooner (*Meda*) specially built and equipped in England for surveying service on the more remote parts of the extensive seaboard of this colony.

In South Australia, the survey of its shores has nearly approached completion, Staff-Commander Howard and staff in the schooner *Beatrice* having reached the province boundary at the head of the Great Australian Bight. Much local work has also been done at the Lower Murray River.

In Queensland, Staff-Commander Bedwell and staff in a hired steam-vessel have made considerable progress to the north of his former year's work. The survey of 1879 includes the area between the mainland stretching from Slade Point in 21° 10' S., to Whitsunday Island in 20° 15' S., and thence to the Barrier Reefs abreast. This large space, including the Cumberland Islands and their numerous off-lying rocks and sand-banks, has been sounded over, many assumed dangers removed, and correct positions assigned to others.

It is to be regretted that this survey was suddenly and unexpectedly brought to a close on the part of the Government of Queensland, on the last day of 1879, financial reasons being assigned as the cause.

Western Pacific Ocean.—The schooner *Alacrity*, under Lieutenant Moore, has been actively at work among the eastern islands and reefs of the Fiji group. Those between Lakemba and C Tonga have

been charted in detail ; the year's survey further extending to those forming the boundary of the important Nanuka passage. A triangulation has also been effected of a large area in the north-east portion of the group generally.

In this region, Lieutenant G. E. Richards in Her Majesty's schooner *Renard*, has done work among the Duke of York Islands, a prominent group in the channel between New Britain and New Ireland ; as also in Blanche Bay, on the former of these islands.

Lieutenant Houghton, in Her Majesty's schooner *Beagle*, has also added to our knowledge of the southern shores of New Guinea between the meridians of $148\frac{1}{2}^{\circ}$ and $150\frac{1}{2}^{\circ}$ east. Additions to the topography of the coasts of this region are from time to time received from the London Missionary Society for our charts. The zealous co-operation of the agents of this Society deserves special mention.

Especial thanks are due to Lieutenant Bower, of Her Majesty's ship *Danae*, for additions to the hydrography of the several islands visited by that ship, notably at the Solomon and Admiralty groups.

Among the useful additions to hydrography made by the officers of the Royal Navy in 1879 is a sketch survey of that part of the West Coast of South Africa lying between False Cape Frio in $18^{\circ} 27' S.$, and Walfisch Bay in $22^{\circ} 50' S.$

This examination, made in H.M.S. *Swallow* by Commander Warren and Navigating-Lieutenant Baynham, resulted from an expedition which had been organised by the Colonial authorities at the Cape of Good Hope for the relief of a party of destitute Trek Boers, but which failed owing to the impossibility of landing the horses and stores provided, on any part of the coast north of Walfisch Bay, although, from report, at least one place of shelter as far north as lat. 19° was believed to exist.

The general results of the *Swallow's* examination show that the coast is apparently free from danger, except in lat. $20^{\circ} 5' S.$ and $21^{\circ} 10' S.$, where breakers extend one to two miles from the shore ; there are no harbours, no places at which landing may be effected in ordinary weather, and no anchorages except those of a temporary character.

A running survey of the greater part of this open and sandy

desert line of coast was made in 1825 by that accurate observer, Captain W. F. W. Owen in Her Majesty's ship *Leven*. This survey has been compared with that made in the *Swallow*; the agreement is very satisfactory, and the incorporated work on a suitable scale for the seaman is on the eve of publication.

As advancing our knowledge of the configuration of the beds of several seas and oceans, hydrography is much indebted to commercial firms engaged in laying submarine telegraph cables. Conspicuous in these enterprises is the Telegraph Construction and Maintenance Company. That accomplished geographer, Vice-Admiral Sir George Richards, the able managing director of this Company has placed at the disposal of the Admiralty, for incorporation on their charts, more than 550 deep-sea soundings obtained by the experienced captains of their small steam fleet.

The extent of the operations may be judged when the record gives depths varying from 1,000 to 2,200 fathoms between Ireland and Newfoundland; in the Red Sea, from 300 to 1,200 fathoms; and from 300 to 2,100 between Aden and Bombay. Along the entire length of the east coast of Africa, from Natal to Aden, in depths varying from 200 to 1,400 fathoms; between Java and Port Darwin, in North-West Australia, from 500 to 1,630; and between Hongkong and Manilla, depths reaching to 2,350 fathoms.

The Indiarubber, Gutta-percha, and Telegraph Works Company, through their engineer, Mr. R. K. Gray, has also contributed a valuable series of deep-sea soundings in the Bay of Biscay. The painstaking accuracy bestowed on this series has added to the delineation of the 100-fathoms edge of the bank of soundings extending from the French shores on the 46th parallel of latitude.

Acknowledgments are also due to Sir James Anderson, the managing director of the Eastern Telegraph Company, for contributions in the same field.

The Hydrographic Department during the past year has issued 205 Notices to Mariners; an increase, indicative of much activity in the interests of commerce over the globe. Thirty-two Hydrographic Notices have also been published, in 323 octavo pages.

In addition to the usual Tide Tables and Light Lists—gradually

expanding from the activity just referred to—the following revised editions of Sailing Directions have been published :—

Bristol Channel.

China Sea Directory, Vol. II.—This embraces the navigation of the China Sea between Singapore and Hongkong.

Africa Pilot, Part I.—This volume includes the West Coast of Africa to the River Cameroons ; with the Azores, Madeira, Canary, and Cape Verde Islands.

Africa Pilot, Part III.—This volume includes the South and East coasts of Africa from the Cape of Good Hope to Cape Guardafui, together with the islands in the Mozambique Channel.

Australia Directory, Vol. II.—Comprises the East Coast, Coral Sea and Torres Strait, South-Eastern Coasts of New Guinea, and Louisiade Archipelago.

There are also preparing for early publication : “Mediterranean Pilot,” Vol. III. ; “The West Coast of Hindostan Pilot;” and “The Norway Pilot,” Part II.

Since the statement of last year, sixty-two new plates of charts and plans have been published ; many of these represent original work, and all may be considered of immediate interest to seamen. Two thousand and forty chart plates have received corrections and additions, some of these in extended and important details ; notices of these latter are now advertised, as in the case of newly published charts. One hundred and ninety-two thousand and sixty charts have been printed during the financial year, for Her Majesty's Service, and for the use of the general public.

NOTES FROM CONSULAR REPORTS.

BORNEO.

Brunei, Sarawak, and Sandakan.—Trade is carried on between these places and Singapore, the exports consisting chiefly of sago, flour, gutta percha, and india-rubber. In addition to this, a considerable traffic goes on between North Borneo and Sulu via Labuan and Singapore. The approximate total value of the exports for 1879, from the above ports, representing that portion of

Borneo which is not under the sovereignty of the Dutch, may be stated at £378,465. The value of the imports in ships from Singapore, for the year 1879, amounted to £290,741, rice and cotton cloth being the commodities of greatest importance.

There appears to be some lack of means of communication between the above ports and Singapore, and probably greater trade might be developed if there were more vessels available for the service. The port of Sandakan is a growing one, and trade is fostered and encouraged by the presence of an Englishman in authority; the exports are nearly all sent to Singapore via Labuan, though nearly all the articles, such for instance as birds nests, rattans, beche de mer, and sharks fins, appear to be more suited for the China market, and probably in time direct trade will spring up between this fine port and Hong Kong. The State of Sarawak is in a very prosperous condition.

ALGIERS.

Since the occupation of Algeria by the French, in 1830, a steady development of commerce has gone on; the natives appear to be contented and disposed to follow agricultural pursuits, and no less than 7,500,000 acres are now under cultivation with cereals. Amongst the most noticeable of the exports for 1879 are wheat, barley, sheep, wool, and alfa (a fibre used in the manufacture of paper). Vine cultivation is now carried on with some success, and excellent wine is said to be made in the colony. Fruit is extensively grown and promises to become an important export to France. One of the principal industries carried on in the immediate neighbourhood of Algiers is the cultivation of early vegetables for the European markets, but the cost of packing, steam freight to Marseilles, landing and transporting to Paris, &c., are all heavy charges, which make it difficult for Algeria to compete with Spain. Ostrich farming is a new industry which has been started in Algeria and promises important results. Two farms are now in existence and a third is in course of formation. Iron, copper, and lead ores are also shipped from Algerian ports.

The imports in 1879 considerably exceeded in value the exports for the same period. Next to the mother country, France, Great Britain has the largest share in Algerian trade. Cotton (manu-

factured), clothing, wool, coffee, and sugar, are the articles most in demand.

From the statement of the number and tonnage of the vessels of all nations entering Algerian ports in 1879, it will be seen that, after French vessels, the greatest number is that of Spanish vessels, generally small coasting craft, while, measuring by tonnage, the amount of British shipping was greater than that of all other nations together, France excepted.

RÉUNION.

The Consul's report on the commercial condition of this French settlement is by no means encouraging. Sugar, coffee, and vanilla are the exports of chief importance, but the first shows a serious falling off for 1879, as compared with preceding years, owing to the great damage done to the canes by the hurricane of March 21st, in that year. The coffee export also has shown a remarkable decline, owing to the yield of the last season being less than that of the preceding year by nearly one-half. The vanilla crop has not fallen off so seriously, and there was a good prospect of a more abundant crop in 1880.

The import trade for 1879 shows an increase over that of the previous year, but this the Consul regards as accidental. A large increase in the importation of rice is referred to the impoverished state of the colony, there being a great demand for cheap food. Wheat and other grain show a falling off, as do sundry other imported articles of food, but there is a small increase in connection with certain other articles which are not regarded as properly forming the import trade of the colony.

The total of entries and clearances of shipping shows no marked alteration; France, of course, takes the lead, but British shipping has increased considerably, owing chiefly to the railway and port works now being constructed. There is no direct trade between England and Réunion; all the requirements of commerce come from France, and the natives appear to have no enterprise. Local impediments to British trade are the want of a safe anchorage, exposure to hurricanes, *ras de marée*, and strong currents; the delays attendant on the conduct of business; the absence of any British firm to assist masters, &c.

It is probable that, in 1882, the harbour will be completed, so that vessels will be able to find shelter from the storms so frequent in that part of the Indian Ocean.

The question of the immigration of Indian coolies into Réunion, is one which has an important bearing on the future of the colony. The inhabitants are too indolent to work and are dependent upon the labour of the Indian immigrants whom they treat in a very harsh manner. Our Government has, however, laid down certain conditions with a view to the protection of the coolies, which, if not agreed to by the colony, will entail a stoppage of the immigration of the Indian labourers and may end in the ruin of the colony.

MEMEL.

This port appears to be suffering from unfavourable conditions. The principal cause, the Consul says, is the awkward locality of the port, its dependence for commerce chiefly on the neighbouring Russian provinces, and the disturbance of the commercial intercourse between Russia and Germany. The rival Russian port of Libau, favoured by low rates on the Russian railways, seems to have appropriated much of the business in grain, linseed, flax, and other Russian produce, which formerly were shipped from Memel. The German tariff, which imposes an import duty on Russian produce, is disliked by the Russian importers, as are also the formalities at the frontier. The consequence of all this is, that importation as well as exportation at the port is seriously decreasing. The timber trade, upon which the existence of the port principally rests, has suffered severely, prices are very low, large stocks are in hand, half the saw mills have had to cease work, and several timber merchants and saw mill proprietors have failed. The low freights paid for imports as well as exports, and the increasing competition by steamers, which take away all goods able to bear a better freight, has rendered shipowning very unprofitable.

The Consul's report concludes: "Thus, for the present, prospects look very gloomy, still it is not the first time that this port has laboured under very disadvantageous circumstances, but they were always overcome by the energy and elasticity of the Memel merchants, past as well as present, who have not lost their

courage, but confidently trust that some way or other will be found to get out of the present dilemma.

ROTTERDAM.

The returns of the shipping trade for 1879 at this port show an increase as regards France, Russia, Spain, Turkey, Sweden, Norway, &c., and a decrease in respect of Great Britain, the Hanse Towns, America, &c. The diminution in the number of vessels from England is attributed to the decrease in the imports of iron, and also to 1879 having been a bad fruit year. The increase from Russia, Turkey, &c., is due to the larger imports of grain; for France and Spain to increased shipments of ore.

The principal articles of produce in this market were coffee, sugar, rice, indigo, hides, tea, tobacco, and cotton, but all appear to have felt the effect of the commercial depression, and the returns of trade compare unfavourably with those of previous years, although the revival of activity in the autumn of 1879 much improved matters. The grain crop of the Netherlands was very unsatisfactory owing to unfavourable weather, which necessitated large importations from Russia and America.

Nevertheless, the general prosperity of the country does not appear to have suffered, for the revenue of 1879 shows a large increase over that of 1878.

PERSIAN GULF.

Bushire.—A scanty rainfall in the winter and spring of 1879 entailed partial failure of crops in South Persia, and in consequence of this check to the export of wheat, &c., there was a considerable decrease in the number of steamships visiting the Persian Gulf. The season for 1880 did not promise to yield any better results.

The cultivation of the poppy is extended and may prove beneficial to Persia.

The principal traffic is carried on with Indian and Chinese ports, to the latter a large quantity of opium being exported from Bushire. To India, England, and other countries, the chief exports consist of raw cotton, poppy seed, raw silk, opium, wool, &c. The imports from India are chiefly cotton goods, indigo, copper, tea, and some woollen articles. From England

67 loaded and 11 in ballast; 109 from foreign countries, of which 22 carried cargoes, and 52 from Roumanian ports. The number of foreign vessels entering was 785, of 201,110 tons; of these, 89 steamers, of 66,367 tons, belong to the French and Austrian regular lines, carrying mails and passengers; 54 steamers of different countries (35 from Greece), and the remaining 642 were sailing vessels, chiefly Greek and Turkish, with a total tonnage of 104,397. Freights ruled low throughout the year.

HAVANA.

The report of the Acting Consul-General in regard to the condition and prospects of the island of Cuba is, on the whole, rather a gloomy one. He asserts that the decline in the commerce since the insurrection is unhappily confirmed more and more each year, and that general and increasing poverty is the order of the day. Nevertheless, it appears that, as regards British trade with Havana in 1879, an increase was apparent both as regards exports and imports. Sugar, cigars, and tobacco are the staple articles of export. The sugar crop of 1879 was exceedingly large, but the price is regulated by the beet-root crop in Europe, which is produced and transported so much more cheaply. The tobacco crop of 1879 was a very good one, but owing to the leaf taking so long a time to mature, but little of the crop was included in the exports of that year, consequently the results of the superior crop are not seen in the return of exports for 1879.

As regards imports, coal continues to be the only cargo of any real importance shipped direct from British ports in British bottoms, although in cotton and linen goods, hardware, and machinery there appears to be scope for further dealings. Manufactured goods are sent in considerable quantities from the United States, but the competition is still said to be in favour of British goods, which have the credit of durability, and are sold as cheaply as American wares.

There are some differential flag duties on goods imported in other than Spanish bottoms, the effect of which has been that small British vessels have been practically shut out from the carrying trade from Europe. Should these duties be abolished, as is

projected, the direct trade with Great Britain will be much stimulated, but the increased competition in the sugar carrying trade with the United States cannot fail to affect the numbers of those British vessels hitherto engaged in it.

The mortality from yellow fever in the hot season of 1879 was remarkably small, considering the number of British vessels then in port. Shipmasters should, however, not forget the risks they run in visiting Havana in the summer months.

A new pilotage tariff has been in force at Cardenas since March 1st, 1879.

1 to 80 tons, 12 dollars	201 to 300 tons, 22 dollars
81 to 100 „ 18 „	301 to 400 „ 25 „
101 to 150 „ 15 „	401 to 500 „ 28 „
151 to 200 „ 18 „	500 upwards 31 „

For removing vessels from or to the quays, the charge is the same as that of inward or outward pilotage, payable according to tonnage.

For changing anchorage at the quays, or for mooring alongside any of the wharves, half of the full charge.

For changing anchorage in the harbour, one quarter of the full charge.

For moving from one wharf to another, one-sixth of the full charge.

MINIKOI ISLAND.

MINIKOI, although considerably nearer the Maldives than the Lakadivhs, is considered to belong to the latter. Its centre is in lat. 8° 17' N., long. 73° 3' E.; the island is consequently distant about 270 miles almost west from cape Comorin. It consists of a narrow strip of low land very few feet above the sea, well-planted with cocoa-nut trees, which are about 70 feet high and visible from a vessel's deck 10 or 12 miles. As it lies in the track of the mail steamers from Aden to Point de Galle, Ceylon, the erection of a lighthouse

upon it has been suggested. The following description of the island is by Captain J. P Basevi, of the Royal Engineers, 1872 :—

“Minikoi is a small coral island dividing the Eight and Nine Degree channels, in long. 73° E. In shape it somewhat resembles a crescent, the concave part facing the north-west ; its total length is about $6\frac{1}{2}$ miles. The northern half of the island is very narrow indeed, being in no place more than 200 yards broad, but the southern portion is wider and averages 600 yards ; the greatest breadth is not more than 1,000 yards. The lagoon is on the west side and has a maximum breadth of $3\frac{1}{2}$ miles ; the reef which encloses it on the west is always bare at low water. The depth of water inside is very variable, but probably does not exceed 8 or 9 fathoms ; towards the southern end the lagoon is very shallow.

“The principal entrance is at the north-east extremity, where there is a depth of 12 feet at high water. There is no surf on the bar at any season, but the channel is narrow, and there is a disagreeable cross surf on the eastern (island) side, which has to be avoided. There are three anchorage grounds, where vessels drawing too much water to enter the lagoon can lie ; none, however, is good. The *Sir John Lawrence* anchored in about 15 fathoms off the north-east end of the island, but there is merely a narrow rocky bank here, and it would be unsafe in bad weather. The best anchorage during the north-east monsoon is westward of the reef a little below the middle of the island, where for a considerable space the depth does not exceed 10 fathoms ; it is about a quarter of a mile from the reef. There is a narrow passage through the reef near, which is used by fishing boats ; it is not more than 12 or 15 feet broad, and about 6 feet deep. The third anchorage is eastward of the island, nearly opposite the village (which is, however, not visible from it), where the depth of water is said to be 20 fathoms. There is a good landing place *in fine weather* close by, the only possible one on the east side of the island, where the surf is always very high. There is a very small detached island at the south-west end of the main island, half-a-mile north of which is a third passage into the lagoon ; it is of the same description as the second one just described, but still narrower. The rise of tide, at springs, is rather under 3 feet.

"The island is elevated only a few feet above the mean level of the sea, and the central parts are, if anything, below that level. Along the east coast, opposite the village, a high bank has been raised for protection against any encroachment of the sea, which the present inhabitants say was built several centuries ago; the bank is over 20 feet high in parts, and extends for quite two miles, if not more. There is a natural bank thrown up by the action of the sea, which is difficult to be distinguished from what may have been artificially constructed. The whole of the island is covered with cocoa-palms, which are the chief source of wealth to the inhabitants, all of whom have their own trees, the rich as many as 2,000. Away from the village, the undergrowth consists chiefly of a prickly bush which has a large white flower of a strong but agreeable scent.

"The village of Minikoi is nearly in the middle of the island, on the west side; it is half-a-mile long, and contains at least 300 houses, arranged in lanes parallel to the water. The houses are invariably built of coral rock, cemented with lime, and are thatched with palm leaves; every house stands in a separate compound, the divisions of which are of cocoa-leaf matting, and the entrances into the enclosures are shut by a hanging mat of the same material. There is abundance of fresh water on the island, almost every house having a separate well; it is slightly brackish, but not at all unpalatable. The people asserted that good water could be found even close to the edge of the lagoon. Besides the wells, there are a number of good-sized tanks, rivetted with masonry, in different parts of the village. In the northern and southern portions of the island water is only found in a few places. There has never been, in the recollection of the present inhabitants, any scarcity of water.

"The people are Mahomedans, and are of the same race as those inhabiting the Maldivhs; they speak the same language, called Malikh or Malkee, and occasionally intermarry with them. They are now, and have been for the last 200 years, under the Rajah of Cannanore,* having voluntarily placed themselves under his rule to

* Minikoi is under the jurisdiction of the British authorities in Malabar. *Hindustan Pilot*, 1866.

obtain protection against the Malabar pirates, who used to molest them. The dress of the men is the same as of those inhabiting the Malabar coast; the women wear a long jacket of a silk material, reaching nearly to the feet. Some of the men do no work, others work as sailors, and fish, but on land do no labour. Every description of land work is done by the women, who clear paths through jungle, collect firewood, &c., &c. The population exceeds 2,000.

“ Behind the village the people have their gardens in which they cultivate plantains, limes, betel, palms, pan, the bread-fruit and papaya, and a few vegetables. No kind of corn or rice is grown. All their food (rice, dal, ghi, &c.) is imported. The chief products of the island are cocoa-nuts, coir, cowries, sugar made from cocoa-palm toddy, and salt fish. The cocoa-nuts, coir, and cowries, are generally taken to Calcutta, the salt fish they take to Ceylon. There are but few animals on the island. The people neither keep cows, sheep, goats, nor dogs; but they keep cats and have plenty of fowls and ducks. The island is overrun with rats which live up in cocoa-nut trees and destroy, it is said, three-fourths of the produce. There are also legions of mosquitoes, which are small, but very pertinacious; they bite through anything. Turtle abound but are not eaten by the people. The climate of the island is said to be very equable.”

ROTUMAH ISLAND.—S.W. PACIFIC.

ROTUMAH Island, which has recently been annexed to form an integral portion of the Fiji group, lies N.N.W. about 245 miles from the nearest of the Fijis. It is nearly 8 miles long, east and west; and its greatest breadth is about $2\frac{1}{2}$ miles. Seen from a distance of 8 to 10 miles it appears to be of moderate elevation, undulating, and hilly. On a nearer approach, it is seen to rise in gentle slopes from the sea to the hills behind, and to attain its greatest elevation towards the middle of the island.

Rotumah was discovered by Edwards of the *Pandora*, in 1791,

and called Grenville island. It was subsequently visited by Duperrey, Dutailis, and others; and more recently, by some of our own surveying vessels stationed in the Pacific.

Dutailis, speaking of Rotumah in 1847, says:—"There are two roadsteads on the north side, equally good or bad according to the season. Oinafa was for some time the most frequented, being the residence of the principal chief, but Fao bay yields most supplies. Water, with the assistance of the natives, can be obtained at both places. The tongue of land uniting the two islands is of recent formation, for the natives still speak of *two* islands. The whole shore is lined with villages, and a very intelligent chief resides at Maftoa on Fao bay."

Rotumah is not a lagoon island, but it is everywhere, except at its west and S.W. parts, fringed with coral reef. The greatest extension of the reef is found near the east point, where it projects northward, fronting Epipigi village, and south-eastward fronting Epipigi peak, to the distance of $1\frac{1}{4}$ mile. Each of these projections has rocks and islets on it. Havae islet, near the edge of the northernmost part of the reef, is 150 to 200 feet high, and covered with cocoa-nut trees; and Atanghaha is a conspicuous islet a third of a mile within the edge of the south-easternmost part of the reef. Elsewhere the reef is best developed on each side of the neck of land to which Dutailis refers, and on which is Itu-utu, the chief mission station.

Westward (northerly) from the west end of Rotumah lies a coral reef, stretching $2\frac{1}{4}$ miles in a N.E. and S.W. direction, on which are two or three conspicuous islets and several rocks; there is no channel through this reef and between the rocks; the westernmost islet (Atana) has a remarkable perpendicular cleft across it, through which the sea passes. At less than half-a-mile from the N.E. end of this coral reef, and $1\frac{1}{4}$ mile from the nearest point of Rotumah, is Uea, or Emery island, half-a-mile long (north and south), bold, conical, and attaining an altitude of 700 feet; it is well wooded, inhabited, and has a fringe of reef off its south side; it bears a striking resemblance to the high wooded bluff that marks the western extreme of the opposite bay on Rotumah, and may (from a distance) be easily mistaken for the bluff itself.

The channel between the western part of Rotumah and the island, islets, and reef just described, varies from $1\frac{1}{2}$ to 3 miles in width, but it should be avoided, as the depths are irregular.

There are two anchorages on the north side of Rotumah; Lee, or Fao bay, towards the west end, and Oinafa bay, or North-East roadstead, towards the east end. These have been visited by H.M.S. *Brisk* (in 1866), and H.M.S. *Basilisk* (in 1872).

Captain Hope, of the *Brisk*, reports as follows:—

“Fao bay, or Lee harbour, is an open bay, about a mile and a-half from the west end of the island. This bay is well marked by a high wooded bluff on its western side, with a precipitous red sandstone face to the water's edge. H.M.S. *Brisk* anchored here in 15 fathoms, with the east point of the bay bearing N.E. $\frac{3}{4}$ E., and the centre of Emery island W. by N. $\frac{1}{2}$ N.”

“Oinafa bay or North-East roadstead is about five miles to the eastward of Lee harbour, at the north-east point of the island, and is close to the westward of two islets lying off the point, which are connected to each other and to the main island by a coral reef; this anchorage is sheltered during the trade wind season, but a nasty sea sets round the island, and Lee harbour is a much superior roadstead. The *Brisk* anchored at the North-East roadstead in 11 fathoms, sand, with the outer extreme of the outer islet, E. by N.; but two cables further in would be a better berth, as there would be more shelter from the trade wind, which frequently blows strong.”

Captain J. Moresby gives the following description of these anchorages:—

“H.M.S. *Basilisk* anchored in $9\frac{1}{2}$ fathoms in North-East roadstead, with the outer islet bearing N.E. by E., and Emery island W. $\frac{1}{2}$ N. In this position, with a strong trade wind blowing, the water was smooth, and the ship was watered in bulk from good wells and a smooth sandy beach. At the same time, in Lee bay a considerable swell was rolling in, and an extensive shore reef extending across the bight of the bay would have rendered landing at low water difficult. At all seasons when the trade wind may be depended upon the North-East roadstead is to be preferred to Lee bay; the latter has the advantage that, if the

wind should be blowing from the northward or westward, a sailing vessel would more readily clear the land. In making Lee bay, ships must avoid closing the eastern point, as off it extends an extensive reef. Care also must be taken, when making the land from the eastward, to distinguish the two islets off the North-East roadstead from two similar islets off the eastern extreme of Rotumah island; the small northern islets are from 150 to 200 feet in height and covered with cocoa-nut trees."

Oinafa bay is nearly opposite the village of Epipigi; and Fao bay fronts the villages of Maftoa and Itu-utu. At the northernmost point of the island is the village of Malaad, but there is no anchorage, and the reef extends a quarter of a mile seawards.

There is also anchorage on the south side of Rotumah, $1\frac{1}{2}$ mile westward of the south-easternmost islet, in 15 to 18 fathoms, half-a-mile from the edge of the reef, and fronting the village of Noatao; but it is considered very indifferent. Here there is a boat passage through the reef.

The Catholic mission is on the south side of the island, near the village of Pepsei, where there is another boat passage.

Strangers looking for the anchorages at Rotumah, may experience some difficulty, especially when making the land from the eastward; therefore approach the island with caution.

Position.—According to the plan of Rotumah, made by the French frigate *Hamelin* in 1871, Epipigi peak, on the S.E. part of the island, is in lat. $12^{\circ} 30' 10''$ S., long. $177^{\circ} 4' 40''$ E. High water at full and change occurs at 6h. 15m., and the rise is 5 to 6 feet.

The natives are very friendly, and can work well when inclined to do so. The lower lands yield large crops of yams, taro, and bananas; and the hills to their summits are thickly studded with cocoa-nut trees. Herds of pigs roam through the interior, and form the chief source of wealth of the inhabitants. With a beautiful climate, a plentiful rainfall, and very fertile soil, sugar, coffee, and cotton can be grown to advantage. The inhabitants are said to number 6,000.

W. H. R.

NAVIGATION OF THE MERSEY.

BY an Order in Council, dated 5th January, 1881, it is directed that the rules hitherto in force for the navigation of the River Mersey, and the sea channels and approaches thereto, shall, from and after the 1st instant (February, 1881), be rescinded, and the rules hereunder stated substituted in lieu thereof.

It will be seen that the new Regulations for Preventing Collisions at Sea are henceforth made applicable to the navigation of the Mersey, and that, in accordance with Article 21 of those Regulations, it will be incumbent on every steamship, when it is safe and practicable, to "keep to that side of the fairway, or mid-channel, which lies on the starboard-side of such ship."

RULES concerning the lights or signals to be carried, and concerning the steps for avoiding collisions to be taken, by vessels navigating the River Mersey.

1. Every vessel exceeding 10 tons measurement, including river craft, while navigating, or anchored, or moored in any part of the River Mersey, shall, from and after the 1st day of February, 1881, observe and obey the new "Regulations for Preventing Collisions at Sea," as set out in the First Schedule annexed to an Order in Council, made in pursuance of the Merchant Shipping Act Amendment Act, 1862, and dated the 14th day of August, 1879, and as varied and amended by an Order in Council made as aforesaid, and dated the 24th day of March, 1880, with the exceptions and additions mentioned in the following rules.

2. Canal flats and all other vessels without masts, whilst being towed, shall carry the lights prescribed for sailing vessels by Article 6 of the said "Regulations for Preventing Collisions at Sea."

3. In addition to the lights for a steam-vessel towing another vessel, prescribed by Article 4 of the said Regulations, such steam-vessel shall carry a bright white light showing a-stern as a guiding light to the vessel or vessels being towed.

4. Instead of the light prescribed by Article 8 of the said Regulations, every vessel when at anchor in the river Mersey shall

carry two white lights in globular lanterns of not less than 8 inches in diameter, and so constructed as to show a clear, uniform, and unbroken light visible all round the horizon for at least one mile, one of which lights shall be placed at a height not exceeding 20 feet above the hull on the fore-stay, or otherwise near the bow where it may best be seen, and the other at the main or mizen-peak, or on the boom topping-lift, or other position near the stern, at double the height of the bow light before mentioned.

5. Instead of the light prescribed by Article 11 of the said Regulations, a bright white light similar to the lights mentioned in Rule 4 shall be shown continuously from the stern-rail of every vessel while under way and in motion in all weathers between sunset and sunrise.

6. A vessel anchored to mark the position of a wreck or other obstruction, shall carry, in all weathers, from sunset to sunrise, two bright white lights, similar to those mentioned in Rule 4, which lights shall be placed horizontally on a cross-yard on the fore-mast, at a height not exceeding 20 feet above the hull, and 20 feet apart. And the said vessel shall carry, in all weathers, between sunrise and sunset, two black balls placed as hereinbefore ordered with regard to the lights aforementioned.

BOOKS RECEIVED.

The Fisherman's Nautical Almanac for 1881. By O. T. Olsen, of Grimsby.

BESIDES the Almanac proper, and Tide Tables for the coasts of Great Britain, and various fishing grounds, this work is very full in the information it gives respecting the lights and buoys in whatever neighbourhood our fishermen are likely to cast their nets. There is also much good advice about weather and the barometer; instructions for the guidance of masters and seamen when the mortar and rocket apparatus is in requisition; notes on the compass; a foreign exchange table; in fact, almost everything

that a man whose craft is confined to the navigation of the North Sea, English Channel, and Irish Sea can require.

Standing Orders for Steamers. By Archibald Miller. London and Liverpool: George Philip and Son.

ORDER is the first law of nature, and is certainly the first requisite on shipboard. If the rules and regulations given in this little book concerning the details of routine duty were indeed common on board every steamer everybody would always be at his post when required, understand what he was there for, and be ready for every duty and any emergency. It is well to have such "standing orders" in print, that all on board may refresh their memory as to the requirements of their position; they are here set out under the various headings of *Standing Orders* for officers, for engineers, for stewards, and for surgeons; and where the regulations have been strictly enforced they have no doubt been found to work well with crews of various composition and numbers, not forgetting the relief passengers must feel when they find themselves in a ship where everything is well conducted, and duties are performed with alacrity and good will.

A Hand-Book of Directions to the Ports in the Presidency of Madras and Ceylon. Compiled by T. E. Marshall, First Assistant-Master-Attendant, Madras. Second edition, improved and revised.

THOUGH confessedly a compilation, the work is very complete for the navigation of the Coromandel coast, the Island of Ceylon, and for ports on the west coast of India, forming the seaboard of Madras. There are sailing directions for the coast, and everything to assist a master, in his commercial and trading transactions, when he arrives at his port. We are not surprised at a second edition having been early called for, and are glad to see that the original design and scope of the work have been extended to a greater number of ports than originally intended. The information is strictly accurate, and much assistance has been rendered by various Masters-Attendant in bringing it up to date, so that the ship-master who frequents the ports of the Madras Presidency, cannot have a better guide than this "*multum in parvo*" directory.

Tide Tables for the British and Irish Ports for the year 1881; also the Times and Heights of High Water at Full and Change for the principle places on the globe. Computed by Staff-Commander H. R. Harris, R.N., London. Printed for the Hydrographic Office, Admiralty.

THIS is the usual annual publication known to British seamen as the "Admiralty Tide Tables." So far as regards the time of high water and the height of the tide at the various ports, and the constants applicable to the standard ports of reference, the information is as perfect as necessary for the ordinary purposes of navigation. The papers on the set of the tidal streams for the coasts of Great Britain and Ireland are also good after their kind, but very badly arranged since they require too much wading through and fishing out to find the set of the stream for any particular part of the coast at any given hour of tide. Besides, they are the same tales year after year, and we have a strong suspicion that there must be, or perhaps there ought to be, in the records of the Hydrographic Office, much more information, and of an important kind, than is given in this work. Considering how frequently the shipmaster is snubbed at official enquiries for not understanding the use of the Tide Tables, the parts to which we have just referred should be better collated and arranged.

Tide Tables for the Indian Ports, for the year 1881 (also December, 1880, and January, 1882). By Captain A. W. Baird, R.E., in Charge Tidal and Levelling Operations, Survey of India, and E. Roberts, F.R.A.S., Nautical Almanac Office, London. By authority of the Secretary of State for India in Council.

We had already (in our volume for 1880) announced that Tide Tables for the Indian Ports were in progress. The work for 1881 is now published, and includes Aden, Kurrachee, Okha Point, and Beyt Harbour (Mouth of Gulf of Cutch), Bombay, Karwar, Beypore (near) Calicut, Paumben Pass, (Island of Ramesweram), and Vizagapatam; and the compilation appears to have been in excellent hands. The Tables of the times and heights of high and low water have been obtained from the curve-delineations of

the new tide-predicting machine, designed and constructed by Mr. Roberts, for the Survey Department of the Government of India. The tidal co-efficients used were deduced from those obtained by Captain Baird, from the Harmonic Analysis of Observations taken in previous years; and Mr. Roberts has made the calculations for the values of such co-efficients as required modification; he has also run off the curves by the machine, measured the co-ordinates, and passed the Tables through the press. The heights, an important element in the navigation of Indian waters, owing to the diurnal inequality, are printed in more conspicuous type than the times, and both are given for low water as well as for high water. These heights are referable to the *mean of lowest ordinary spring tides*, and for the depth of water are immediately applicable, by *addition*, to the soundings on the charts. The Tables explain themselves at a glance. The Lunar phenomena at the bottom of each page are for the information of the mariner, and the aspects which have a superior effect in raising the water are printed in small capitals. Altogether, the work is clearly printed and of easy reference—both excellent qualities.

Telegraphic Determination of Longitudes on the East Coast of South America, embracing the Meridians of Lisbon, Madeira, St. Vincent, Pernambuco, Bahia, Rio de Janeiro, Monte Video, Buenos Ayres, and Para, with the Latitude of the several stations. By Lieut. Commanders F. M. Green and C. H. Davis, and Lieut. J. A. Norris, U.S.N., in 1878 and 1879. Washington: Government Printing Office, 1880.

In 1877, the United States Hydrographic Office was busy establishing, by means of the telegraph cable, secondary meridians in the West Indies and Central America. In 1878 and 1879, attention was turned to the ports on the east coast of South America, the longitudes of which have always been in dispute, and have been very uncertain until recently. The work before us gives a complete account of the operation, and the methods employed under the various heads of description of stations and instruments; determination of instrumental constants and personal equation; methods of observation; methods of reduction; data

of reduction and results—longitude and latitude; resulting latitudes and longitudes. Advantage was taken of the recently completed telegraph cables, to measure from some well determined point in Europe, by way of Madeira and the Cape Verde Islands, to the ports on the east coast of South America. The cable of the Eastern Telegraph Company extends from the Land's End, in England, to Carcavellos, at the mouth of the Tagus River, where it joins the cable of the Brazilian Submarine Telegraph Company, connecting Europe with Madeira, Porto Grande, in the Cape Verde Islands, and Pernambuco, on the coast of Brazil. Along the coast of South America, from Para on the north, to Buenos Ayres on the south, the lines of the Western and Brazilian Telegraph Company unite the ports of Para, Maranhão, Pernambuco, Bahia, Rio de Janeiro, Monte Video, and Buenos Ayres. The longitudes were fixed by telegraphic exchanges of time-signals, the initial point of measurement being the meridian of the Royal Observatory at Greenwich. The latitudes (with the exception of Lisbon, determined by the Director of the Royal Observatory, Captain F. A. Oom) result from numerous zenith-telescope observations of pairs of stars.

Our readers will be most interested in the *recapitulation of results*, and this we give below.

- (1) Lisbon—Centre of dome of Royal Observatory—
Lat. N. $38^{\circ} 42' 31.25''$... Long. W. 0h. 36m. 44.68s. = $9^{\circ} 11' 10.2''$
- (2) Funchal, Madeira—Flagstaff of Fort St. Jago—
Lat. N. $32^{\circ} 38' 4.08''$... Long. W. 1h. 7m. 35.56s. = $16^{\circ} 53' 53.4''$
- (3) Porto Grande, Cape Verde Islands—Flagstaff in front of Brazilian Submarine Telegraph Co.'s Office—
Lat. N. $16^{\circ} 53' 20.12''$... Long. W. 1h. 39m. 57.48s. = $24^{\circ} 59' 22.3''$
- (4) Pernambuco, Brazil—Lighthouse near Fort Picão—
Lat. S. $8^{\circ} 3' 22.21''$... Long. W. 2h. 19m. 27.77s. = $34^{\circ} 51' 56.55''$
- (5) Bahia, Brazil—San Antonio Lighthouse—
Lat. S. $13^{\circ} 0' 37.38''$... Long. W. 2h. 34m. 8.37s. = $38^{\circ} 32' 5.55''$
- (6) Rio de Janeiro, Brazil—Centre of dome of Imperial Observatory—
Lat. S. $22^{\circ} 54' 23.75''$... Long. W. 2h. 52m. 41.41s. = $43^{\circ} 10' 21.15''$
- (7) Monte Video, Uruguay—South-east tower of the Cathedral—
Lat. S. $34^{\circ} 54' 33''$... Long. W. 3h. 44m. 49.02s. = $56^{\circ} 12' 15.3''$

(8) Buenos Ayres, Argentine Republic—Cupola of Custom House—
Lat. S. $34^{\circ} 36' 29.79''$...Long. W. 3h. 53m. 28.95s. = $58^{\circ} 22' 14.25''$

(9) Para, Brazil—Portico of Custom House—
Lat. S. $1^{\circ} 26' 58.71''$ Long. W. 3h. 14m. 0.04s. = $48^{\circ} 30' 0.6''$

The Government of the United States deserve our best thanks for the good work they have undertaken in the establishment of secondary meridians on which reliance can be placed in determining geographical positions.

Port Charges and Requirements on Vessels in the various Ports of the World. By Theodore Hunter and Jarvis Patten. Under the recommendation of the Maritime Association of the Port of New York. New York: John Wiley & Sons. 1880.

THE bulky volume now before us is a striking instance of the thoroughness with which our friends across the Atlantic do their work. The authors claim that it affords information respecting nearly every port in the world, in regard to location, description, population, exports, imports, arrivals of vessels, showing the amount of trade, depth of water on bars, in harbours, at wharves, description of anchorage, rise and fall of tides, government rules and charges, quarantine and sanitary rules and charges, light dues, dry docks and facilities for repairing vessels, custom as to handling cargo and lighterage, together with a statement of whatever expenses a vessel is liable to, a synopsis of commercial treaties, a reduction of money, weights, and measures, of all nations, to the English, French, and American units. On looking through the work, we find that the compilers have satisfactorily proved their claim, for the information in all cases is abundant; and, certainly so far as British ports are concerned, very accurate. The work is divided into two parts, the first portion being devoted entirely to ports of the United States and Dominion of Canada. It also includes some well-written and practical suggestions to masters of vessels, pointing out how they should act in cases of disaster; which, in a future number of this journal, we hope to reproduce for the benefit of our readers. A useful treatise on stowage of cargo is added, with which are embodied the grain rules of the New York Board of

Underwriters, of the United States Lloyd's, and the Marine Underwriters of Philadelphia, and the rules for loading petroleum in force at New York, Philadelphia, and Baltimore.

The second part contains information concerning 3,000 foreign ports, and the compilers state that supplemental issues will be made, giving particulars of changes in customs and charges at existing ports, and also information concerning new ports opened to commerce. In addition to particulars given for each separate port, a general account of trade, &c., is given of each country of importance, which, with sundry maps of different places, makes the work exceedingly complete.

Altogether the volume is an admirable example of useful work well done. It is capitally printed and edited, and the only objections are the bulkiness of the book, and probably the price, which, considering the great difficulties and delays which have been overcome in the production of such a work, must necessarily be somewhat high.

The Telegraphic Codex to accompany the Port Charges of the World. By Theodore Hunter and Jarvis Patten. Second Edition. Revised and adapted to the regulations of the United Cable Companies. New York: J. Wiley & Sons. 1880.

THE merits of this work are a copious index, by means of which a subject or sentence may be found by reference to its leading word. It is especially intended for business communications, and there cannot be a doubt that owners and shipmasters employing this book would find it an economical investment, as they may communicate at one-fifth of the cost of sending the shortest message in full.

DECAY OF AMERICAN SHIPPING.

HE annual report of Joseph Nimmo, Jun., chief of the Bureau of Statistics, on the foreign commerce of the United States, was completed on December 16th.

Regarding the maritime interests of the United States, Mr. Nimmo says: "The decadence of that branch of the American merchant marine which is employed in the foreign commerce of the country continues to engage the public attention. This decadence is indicated by the following facts:

"The building of ships and barks employed in our foreign commerce fell from an annual average of 233 during the ten years from 1851 to 1860, to an annual average of 56 during the ten years from 1871 to 1880. There were only 23 ships and barks built during the year ended June 30, 1880. The iron steamship is now the controlling vehicle of commerce on the ocean.

"The total tonnage built on the seaboard, embracing the Atlantic, Gulf and Pacific coasts, including both tonnage built for the coastwise and for the foreign trade, but chiefly for the coastwise trade, fell from 1,013,040 tons during the five years from 1866 to 1870, to only 669,362 tons during the five years from 1876 to 1880.

"The American tonnage built on the great lakes, almost exclusively for internal trade, fell from 214,333 tons during the five years from 1866 to 1870, to 74,499 tons during the five years from 1876 to 1880.

"The tonnage of iron vessels built in this country during the last five years amounted to only 101,823 tons, almost entirely for our coastwise or home trade, in which no foreign competition is allowed under the provisions of our navigation laws, whereas the iron shipbuilding of Great Britain during the last five years reported amounted to 1,800,193 tons. It is stated that the iron steamers designed for the transatlantic trade, now in course of construction in the shipyards of Great Britain, would, if placed in line, extend about one mile.

"The total tonnage of the United States employed in foreign trade fell from 2,379,396 tons in 1860, to 1,314,402 tons during the year ended June 30, 1880. * * * *

"During the year ended June 30, 1880, the total value of commodities transported in American and foreign vessels (imports and exports), amounted to the sum of \$1,589,472,093, of which the value transported in American vessels amounted to only \$280,005,497, or 17·6 per cent., and the value transported in foreign vessels amounted to \$1,309,466,496, or about 82 per cent.

* * * A marked decline in the proportion of the commodities carried in American vessels has taken place during the past year, the falling off having been from 32 per cent. in 1879, to 17·6 per cent. in 1880. The branch of the American merchant marine which is employed in the internal and coastwise commerce of the United States, it is shown, also exhibits a decline, notwithstanding the fact that under our navigation laws no foreign vessel is allowed to engage in this trade. The tonnage thus employed fell from 3,293,439 tons in 1874, to 2,637,685 tons in 1880.

"The tonnage employed in the domestic trade of the United States (the ship ton being 100 cubic feet of space) on June 30, 1880, amounted to 2,637,685 tons. This embraces vessels employed both in the carriage of passengers and freight. But the capacity of railroad cars of all descriptions employed on the railroads of the United States amounted, according to the latest and most reliable information, to about 7,100,000 similar tons of 100 cubic feet of space. This railroad-car tonnage, however, the report says, actually affords the means of transport for a much larger amount of freight tonnage than is indicated by the foregoing comparison.

CORRESPONDENCE.

SIDE-LIGHTS IN STEAMERS.

To the Editor of the "Nautical Magazine."

SIR,—I respectfully request space in your valuable publication for a few remarks about the position of side-lights in steamers, which remarks I have for some time retained, expecting to see

them published by a more skilful and experienced pen than mine. I know there is a regulation for sailing vessels, making it compulsory for them to have their lights placed in the fore-rigging: as in the case of collision between the *Vindolana*, steamship, and *Brothers*, barque, mentioned in the March issue of *Nautical Magazine*, 1878, the master of the *Brothers* was censured for having his lights placed in the mizen-rigging. This is quite right, and ought to be so in sailing vessels of all nations. As to steamers, there is no rule, as far as I know, concerning the position of their side-lights, and they are to be seen with their side-lights placed, sometimes abaft, sometimes right underneath, and sometimes even before the masthead-light. I wish to draw your attention to the advantage of making it compulsory for every steamboat master to have his side-lights placed well abaft the masthead-light, say, not less than 35 or 40 feet.

If on a hazy night you make out a steamer's light on either bow, there will never be the slightest doubt as to the colour of the side-light when you know the latter to be placed at a good distance abaft the masthead-light, and, what is also to be taken into consideration, there will be in many cases a possibility for you of ascertaining in some measure the position of the other steamer, which there will never be when the side-lights are placed right underneath the masthead-light.

In several newly-built steamers fitted with light-turrets, the side-lights are placed before the masthead-light, which is still more deceiving. We have got a rule concerning the height of the masthead-light above the deck, why should we not have another to appoint the distance between the lights?

Hoping you will think the subject treated of of sufficient importance to find a place in your valuable publication,

I remain, yours truly,

C. A. JORGENSEN.

Valetta, 7th January, 1881.

TIDE TABLES FOR FEBRUARY, 1881.
Also Ports of Reference for the Constants in the next Table.

WEEK DAY.	MONTH	LONDON BRIDGE.		HULL.		NORTH SHIELDS.		LEITH.		DEVON- PORT.		DOVER.		WESTON- SUTER- MAR.		LIVER- POOL.		GREEN- OCK.		QUEEN- TOWN.		KINGS- TOWN.		LONDON- DERRY.		BREST.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
Th	1	3 24	3 45	7 59	8 20	4 50	5 12	3 46	4 8	7 15	7 36	0 27	0 50	8 26	8 45	0 31	0 53	1 29	1 49	6 24	6 55	0 19	0 41	9 27	9 46	5 10	5 25
Fr	2	3 41	4 02	8 06	8 27	5 04	5 26	4 29	4 50	7 22	7 43	1 13	1 35	8 32	8 51	1 13	1 35	2 36	2 56	7 15	7 35	1 39	1 59	10 40	10 59	5 20	5 35
Sa	3	4 45	5 7	9 20	9 40	6 16	6 38	5 10	5 30	8 23	8 52	1 56	2 18	9 40	9 57	1 53	2 15	3 26	3 46	7 54	8 13	2 45	3 05	11 48	11 67	6 00	6 15
Su	4	5 20	5 46	10 00	10 19	6 56	7 16	5 51	6 12	9 9	9 35	2 26	2 48	10 10	10 27	2 33	2 55	4 06	4 26	8 33	8 52	3 25	3 45	12 23	12 42	6 55	7 10
Mo	5	6 5	6 25	10 59	11 3	7 37	8 1	6 34	6 58	9 43	10 1	3 16	3 38	10 46	11 5	3 8	3 28	5 17	5 37	9 7	9 28	4 7	4 27	—	0 20	7 50	8 15
Tu	6	6 45	7 01	11 32	—	8 28	8 59	7 24	7 54	10 21	10 44	4 58	4 29	11 27	11 55	4 52	4 50	4 41	4 5	9 52	10 30	5 55	4 24	0 54	1 30	8 45	9 15
We	7	7 35	8 3	0 4	0 38	9 34	10 18	8 28	9 5	11 10	11 40	4 48	5 15	—	0 29	4 52	5 26	5 55	6 10	10 58	11 43	4 58	5 33	2 9	2 49	9 49	10 28
Th	8	8 27	9 18	1 13	1 43	10 52	11 31	9 45	10 25	—	0 18	5 52	6 29	1 6	1 47	6 11	6 50	6 47	7 27	—	0 13	6 9	6 46	8 23	4 6	11 12	11 50
Fr	9	10 7	10 49	2 26	3 4	—	0 10	11 4	11 42	0 50	1 41	7 9	7 51	2 30	3 12	7 38	8 17	8 8	8 48	0 55	1 50	7 25	8 3	4 41	5 19	10 97	10 37
Sa	10	11 29	—	3 42	4 19	0 48	1 23	—	0 16	2 24	3 2	8 29	9 1	3 53	4 29	8 52	9 23	9 26	9 58	2 14	2 47	8 50	9 10	5 43	6 1	11 45	11 45
Su	11	0 6	0 35	4 49	5 13	1 50	2 12	0 44	1 6	3 35	4 4	9 25	9 47	4 59	5 2	9 46	10 39	10 39	10 46	3 15	3 38	9 36	9 59	6 46	7 10	12 31	12 31
Mo	12	1 2	1 24	5 32	5 45	2 32	2 49	1 26	1 44	4 28	4 51	10 7	10 26	5 47	6 7	10 22	10 39	11 6	11 24	3 59	4 17	10 17	10 34	7 3	7 22	2 48	3 6
Tu	13	1 43	2 3	6 6	6 29	3 5	3 29	2 1	2 17	5 11	5 30	10 45	11 8	6 37	6 46	10 56	11 19	11 42	mid.	4 35	4 53	10 40	11 4	7 39	7 50	3 29	3 38
We	14	2 18	2 38	6 40	6 57	4 3	3 54	2 33	2 45	5 49	6 6	11 21	11 39	7 3	7 52	11 29	11 46	—	0 17	5 9	5 24	11 19	11 34	8 12	8 27	3 54	4 10
Th	15	2 47	3 8	7 14	7 31	4 5	4 21	3 4	3 19	6 22	6 38	11 57	—	7 56	7 52	—	0 1	0 34	0 51	5 43	6 11	5 6	11 50	8 41	8 55	4 30	4 43
Fr	16	3 17	3 23	7 47	8 2	4 37	4 23	3 24	3 49	6 54	7 10	1 14	0 30	8 8	8 23	0 17	0 39	1 7	1 25	6 15	6 31	6 0	12 2	9 9	9 24	4 57	5 12
Sa	17	3 47	4 3	8 17	8 32	5 9	5 26	4 4	4 20	7 25	7 40	0 47	1 4	8 38	8 53	0 49	1 5	1 39	1 56	6 47	7 8	0 38	0 54	9 39	9 54	5 28	5 41
Su	18	4 19	4 34	8 47	9 4	5 43	6 6	4 37	4 54	7 56	8 13	1 21	1 39	9 8	9 24	1 21	1 37	2 11	2 27	7 19	7 42	1 11	1 28	10 10	10 25	6 0	6 17
Mo	19	4 51	5 9	9 22	9 41	6 17	6 33	5 11	5 29	8 30	8 47	1 57	2 16	9 40	9 56	1 53	2 16	2 45	3 0	7 53	8 11	1 46	2 3	10 43	11 9	6 34	6 50
Tu	20	5 25	5 43	9 59	10 19	6 55	7 13	5 49	6 11	9 4	9 22	2 35	2 55	10 12	10 29	2 28	2 47	3 18	3 36	8 29	8 48	2 34	2 45	11 25	11 53	7 13	7 34
We	21	6 1	6 26	10 40	11 7	7 39	8 6	6 25	7 2	9 43	10 7	3 15	3 37	10 48	11 1	3 8	3 52	3 57	4 20	9 34	9 53	3 7	3 13	—	0 23	7 58	8 26
Th	22	6 49	7 18	11 4	—	8 38	9 13	7 33	8 1	10 39	11 4	4 2	4 39	11 40	—	4 0	4 33	4 47	5 18	10 50	10 40	4 4	4 38	1 4	1 46	8 58	9 36
Fr	23	7 50	8 30	1 19	1 0	9 58	10 44	8 50	9 37	11 43	—	5 6	5 44	0 28	5 14	6 3	5 56	6 39	11 22	—	5 19	5 6	5 24	3 21	10 21	11 12	—
Sa	24	9 15	10 7	1 42	2 26	11 30	—	10 25	11 9	0 27	1 15	6 28	7 16	1 47	2 36	6 55	7 44	7 37	8 14	0 10	1 0	6 46	7 29	4 4	4 40	—	0 1
Su	25	10 52	11 37	3 9	3 49	0 16	0 52	11 48	—	2 2	2 44	7 09	8 36	3 21	4 4	8 25	8 58	8 56	9 33	1 4	2 27	8 9	8 45	5 16	5 44	0 44	1 20
Mo	26	—	0 12	4 24	4 53	1 26	1 54	0 20	0 48	3 23	3 58	9 8	9 37	4 41	5 15	9 28	9 54	10 50	10 34	2 57	3 28	9 18	9 48	6 9	6 34	1 52	2 19
Tu	27	0 44	1 11	5 20	5 44	2 30	2 48	1 14	1 38	4 29	4 56	10 3	10 28	5 44	6 10	10 17	10 36	11 0	11 25	3 54	4 18	10 13	10 33	6 59	7 23	2 43	3 5
We	28	1 36	1 58	6 7	6 29	3 4	3 52	2 0	2 21	5 21	5 45	10 51	11 14	6 34	6 57	11 1	11 23	11 48	—	4 41	5 8	10 53	11 13	7 44	8 5	3 27	3 48

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

By applying the Tidal Constant of the place, according to its sign (+ or - sub.), to the time of high water on the given day at the port of reference, have the time of high water at the place sought.

PLACE.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
	H. M.			H. M.	
Aberdeen	-1 17	Leith	Jersey (St. Helier)	+2 38	Brest
Aberystwyth	-3 52	Liverpool	Kinsale	-0 18	Queenstown
Alderney	+2 59	Brest	Lerwick (Shetland) ..	-3 47	Leith
Antwerp	+5 13	Dover	Limerick	+1 15	Queenstown
Arbroath	-0 42	Leith	Lisbon bar	-1 17	Brest
Arcachon	+0 50	Brest	Littlehampton	+0 34	Dover
Arklow	-2 25	Kingstown	Llanelly bar	-0 38	Weston-s.-M.
Ayr	-0 18	Greenock	Lowestoft	-4 1	London
Banff	-1 49	Leith	Lynn & Boston Deep ..	-0 29	Hull
Bantry harbour	-1 14	Queenstown	Margate	-2 18	London
Barnstaple bridge	-0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
Bayonne	-0 2	Brest	Millford Haven entr. ..	-0 58	Weston-s.-M.
Beachy head & Rye bay ..	+0 8	Dover	Montrose	-0 52	Leith
Beaumaris	-0 51	Liverpool	Morlaix	+1 6	Brest
Belfast	+2 42	Londonderry	Needles point	-1 26	Dover
Berwick	-1 5	N. Shields	Newcastle	+0 33	N. Shields
Blyth	-0 8	N. Shields	Newhaven	+0 39	Dover
Bordeaux	+8 3	Brest	Newport	+0 16	Weston-s.-M.
Boulogne	+0 13	Dover	Nienport	+1 6	Dover
Bridport	+0 22	Devonport	Nore	-1 28	London
Bristol & King Road ..	+0 19	Weston-s.-Mare	Orfordness	-2 43	London
Cadiz	-2 3	Brest	Oporto	-1 17	Brest
Caernarvon	-1 56	Liverpool	Ostende	+1 13	Dover
Calais	+0 37	Dover	Padstow	-1 41	Weston-s.-M.
Campbellton	-0 23	Greenock	Peel, Isle of Man	-0 15	Liverpool
Cardiff	+0 2	Weston-s.-Mare	Pembroke Dock	-0 42	Weston-s.-M.
Cardigan bar	-4 22	Liverpool	Penzance	-1 13	Devonport
Carlingford bar	-0 10	Kingstown	Peterhead	-1 43	Leith
Chatham	-0 47	London	Piel harbour, Barrow ..	-0 18	Liverpool
Cherbourg	+4 2	Brest	Plymouth breakwater ..	-0 6	Devonport
Coleraine	-1 37	Londonderry	Poole	-2 2	Dover
Coquet Road	-0 23	N. Shields	Port Carlisle	+0 47	Liverpool
Cordouan Tower	-0 10	Brest	Portland breakwater ..	+1 18	Devonport
Cowes (West)	-0 27	Dover	Port Patrick	-0 58	Greenock
Crinan	+4 41	Greenock	Portsmouth	+0 29	Dover
Cromarty	-2 21	Leith	Ramsgate	-2 19	London
Dartmouth	+0 33	Devonport	Rotterdam	+4 43	Dover
Deal & Downs	+0 3	Dover	Santander	-0 17	Brest
Dieppe	+7 19	Brest	Scarborough	+0 43	N. Shields
Donaghadee	+0 3	Kingstown	Selsea bill	+0 33	Dover
Donegal harbour	+0 17	Queenstown	Sheerness	-1 21	London
Douglas & Ramsay	-0 11	Liverpool	Shoreham	+0 22	Dover
Dublin bar	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
Dundalk	-0 16	Kingstown	Southampton	-0 42	Dover
Dungeness	-0 27	Dover	Spurn point	-1 3	Hull
Dunkerque	+0 56	Dover	St. Ives	-2 10	Weston-s.-M.
Exmouth	+0 38	Devonport	St. Malo	+2 18	Brest
Falmouth	-0 46	Devonport	St. Mary (Scilly)	-1 16	Devonport
Fecamp	+6 57	Brest	St. Nazaire	-0 7	Brest
Ferrol	-0 47	Brest	Stornoway	+6 38	Greenock
Flamborough head	-1 59	Hull	Stromness (Orkneys) ..	-5 17	Leith
Fleetwood	-0 12	Liverpool	Sunderland	-0 1	N. Shields
Folkestone	-0 5	Dover	Swansea bay	-0 53	Weston-s.-M.
Fowey	-0 29	Devonport	Tay bar	-0 11	Leith
Flushing	+1 42	Dover	Tees bar	+0 22	N. Shields
Galway bay	-0 26	Queenstown	Tenby	-1 12	Weston-s.-M.
Gibraltar	-1 27	Brest	Thurso	-5 49	Leith
Glasgow (Port)	+0 10	Greenock	Torhay	+0 17	Devonport
Gloucester	+2 51	Weston-s.-Mare	Tralee bay	-0 58	Queenstown
Granville	+2 26	Brest	Ushant (Ouessant)	-0 15	Brest
Gravesend	-0 43	London	Valencia harbour	-1 19	Queenstown
Grimsby (Great)	-0 53	Hull	Waterford	+0 19	Queenstown
Guernsey (St. Peter) ..	+2 50	Brest	Westport	-0 4	Queenstown
Hartlepool	+0 5	N. Shields	Wexford	+2 20	Queenstown
Harwich	-1 52	London	Whitby	+0 22	N. Shields
Havre	+6 4	Brest	Whitehaven	-0 9	Liverpool
Heligoland	+0 21	Dover	Wick	-2 55	Leith
Holyhead	-1 12	Liverpool	Wicklow	-0 41	Kingstown
Holy Island harbour ..	-0 53	N. Shields	Workington	-0 19	Liverpool
Honfleur	+5 42	Brest	Yarmouth road	-4 43	London
Inverness	-1 59	Leith	Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. W. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C.; 6, Lord Street, Liverpool; and 10, Berridge Street, Leicester.

ENGLISH (APPLICATIONS).

5276. George Daniel Davis, 669, Commercial Road, Stepney, engineer. "Improvements in windlasses for ships."

5302. William Horatio Harfield, Mansion House Buildings, London. "Improvements in reels and apparatus connected therewith, for coiling wire ropes on board ship."

5316. James Sample Blythe. "Improvements in buoys, or life and property saving apparatus for sea use."

5358. Farnham Maxwell Lyte, Putney, Surrey. "An improved method of protecting from corrosion or fouling, iron and steel ships, and other vessels and structures."

5383. James Tangye, Redruth, and Richard John Cannack, Helston, Cornwall. "Improvements in ships and other vessels, and in reducing the resistance caused by friction in the propulsion of ships and vessels."

5449. William Benjamin Barker, Hoboken, New Jersey, U.S.A., master mariner. "Improvements in signalling by sound in fogs, for sea and river navigation."

5454. Alexander Forbes, Govan, Renfrew. "Improvements in, and connected with skylights, for ships' cabins, and for houses."

5455. Frederick Hahn Dauchell and Rudolph Blum, both of Paris, France. "Improvements in ships and vessels."

5465. William Atkinson, Battersea Rise, London, Surrey. "Raising submerged vessels and other sunken bodies, being improvements in an apparatus for raising sunken vessels and other submerged bodies."

5488. Benjamin King, Paris, France. "A combined seat and life-saving apparatus, for use on board ships." (A communication.)

5500. John Goudie, East Hartlepool. "A new method or

means for preventing the shifting of cargoes on board steamships or other vessels at sea."

5514. Charles Ambrose McEvoy, 18, Adam Street, Adelphi, Middlesex. "Improvements in torpedoes."

1, 1881. George Ducat Robinson, Palace Chambers, St. Stephen's, Westminster, C.E. "Improvements in machinery or apparatus for imparting motion to ventilating, pumping, and other appliances on board ship."

16. Thomas Frederick Truru, Liverpool. "Improvements in screw steamships,"

21. Andreas Lehmann, Dresden, Saxony, Germany. "Improvements in apparatus for extinguishing fire on board ships and other vessels." (A communication.)

77. David McCallum, of the Octagon, Plymouth. "Improvements in compasses for iron ships."

104. James George Galley, Plaistow, Essex, and Thomas Smith, London Bridge, Surrey. "A new or improved combined hydrostatic steam-governor for marine engines."

109. James Harrold Barry, London. "Improvements in apparatus for lowering and detaching ships' boats."

111. Richard Golsten Sayers, 12, Hunter Street, Brunswick Square, London. "Preventing the sinking of ships."

114. William Legge, Middlesborough. "Improvements in the means or apparatus employed for steering vessels, part of such improvements being applicable for other purposes."

133. Samuel Lake, and Thomas Walmsley Taylor, both of Victoria Street, Westminster. "Improvements in and relating to apparatus for supporting and guiding caissons or gates used for opening and closing docks or basins, which invention is also applicable to floating bridges, or pontoons, or the like."

132. Samuel Lake and Thomas Walmsley Taylor, both of Victoria Street, Westminster. "An improved method of building harbours, breakwaters, forts, lighthouses, and other structures, with subaqueous or submerged foundations."

139. Charles Mace, Sunderland. "Improved apparatus for relieving strains on ropes or chains in towing, mooring, or anchoring vessels and for other like purposes."

149. Samuel Searle Hazeland, St. Sampson's, Cornwall. "Improvements in rowlocks for ships and other boats."

162. Thomas Rowan, Ryde, Isle of Wight. "Improvements in the method of, and apparatus for ventilating buildings, water-closets, ships, or vessels, and the like."

187. John McLeod, New York City, U.S.A. "Improvements in masting and rigging boats and vessels." (A communication.)

199. Joseph Knight Kilbourn, Brixton, Surrey, and George Fossick, Stockton-on-Tees. "Improvements in steering-gear."

AMERICAN.

234863. Ira Farnsworth, Boston, Massachusetts. "A marine clock."

235157. Francis A. Loomis, Onondaga, New York. "A fisherman's reel."

235509. Richard Chester, Chicago, Illinois. "A fog-horn for vessels."

235510. Thomas H. Chubb, Post Mills, Vt. "A float and sinker for fishing lines."

235511. Thomas H. Chubb, Post Mills, Vt. "A reel-fastener for fishing rods."

235512. Thomas H. Chubb, Post Mills, Vt. "A metallic reel-seat for fishing rods."

235513. Thomas H. Chubb, Post Mills, Vt. "A metallic reel-seat for fishing rods."

235691. Thomas McCarter and Thomas Cooper, Londonderry, Ireland. "A screw steamship."

235822. Henry N. Staats, Auburn, New York. "An apparatus for steering row-boats."

235823. Henry N. Staats, Auburn, New York. "An apparatus for propelling row-boats."

AUSTRIAN.

1095. H. Attems, Schloss, Ehrenhausen. "An hydraulic cable-ship."

BELGIAN.

52860. L. Henrion, Ghent. "Increasing the speed of ships."

52700. L. Henrion, Ghent. "Means of increasing the speed of ships."

52733. P. Brotherhood. "Torpedo lances."

PATENTS PUBLISHED.

STOWING AND DISCHARGING TORPEDO BOATS.

2325. June 9th. John Edwin Atkinson, of Greenwich, Kent. Price 10d. The object of this invention is to improve the stowing and discharging of the torpedoes, and to enable them to be discharged in any desired direction without turning the boat, and without the enemy having the least idea of the actual direction in which it will travel. These ends are attained in the following simple manner:—A "well" is fitted in the boat, opening out beneath, but closed when not in use by close fitting doors, so as to make the bottom of the boat level, and not obstruct its progress. A "discharging trunk" in the well is so arranged, that it can be lowered to the bottom (the doors being first moved clear), and either end dipped at pleasure. A "carrier" or lift takes the torpedoes, which are arranged upon swing brackets within the well, and lowers them into the discharging trunk, which is then closed up, and the desired end dipped till the torpedo can just clear the bottom of the boat. An impulse tube at each end of the discharging trunk impels it in the desired direction. In a small boat the "well" and apparatus is arranged in a fore-and-aft direction, so that the torpedo can be discharged either a-head or a-stern without any intimation to the enemy even that a discharge is taking place at all. In a larger vessel the well may be fitted in a fore-and-aft transverse or oblique direction; or there may be two wells, one fore-and-aft, and the other transverse, so that two torpedoes can be discharged simultaneously at right angles to each other. A few of the advantages of this method are, that the crew are entirely under cover the whole time, and need never be exposed as in the ordinary boats, where they have to come upon deck to discharge the torpedo, and are, of course, exposed to the enemy's fire; that the enemy cannot possibly know in what direction the torpedo will come, or even that one will come at all; that the torpedoes can be more closely packed, and more

expeditiously discharged, and with more certainty than under the old system.

SHIPS CARRYING GRAIN CARGOES.

2375. June 11th, 1880. Patrick Clarke, Tyne Plate-glass Works, South Shields. (Not proceeded with.) Price 2d. This invention consists mainly of moveable partitions, dividing the hold into any number of chambers, from one to six, longitudinally. They may be of sheet-iron or canvas; if the latter, they are clewed-up to the underside of the decks when not in use. They are secured sideways against the strain of the grain by ropes attached to them at frequent intervals, and made fast to eye-bolts in the ship's ribs; the successive tiers of ropes are put in as the grain rises during the loading.

CONSTRUCTING NAVIGABLE VESSELS.

2405. June 14th. Andreas Olsen, Ephraim, Utah, U.S.A. (A communication.) Price 6d. The hull consists of two longitudinal tubular pontoons, sustained parallel to each other at a suitable distance apart by transverse connecting braces in combination with struts extending vertically from each pontoon, with longitudinal air-tight cylinders connected to the upper ends of the struts immediately above and parallel to the pontoons, and with transverse bracings connecting the two cylinders, the structure so formed being adapted to sustain the decks, cabins, and other parts of the vessel, the arrangement being such that if the struts and upper cylinders should accidentally become detached from the pontoons, the upper cylinders will float the remaining structure. Upon the vessel are one or more turntables, supported on deck, so as to permit of them being readily turned, so that paddle-wheels carried on them may be directed to propel the vessel in any direction, the wheels working between the pontoons. When the vessel is moved broadside on, centre-boards, appropriately set, are used to keep her on her course.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	PLACE.	SUBJECT.
29	ENGLAND—River Thames—Chapman and Mucking Lights	Alteration in character.
30	" Thames Entrance—Smith's Knoll Buoy	Alteration in character; now matic.
31	" East Coast—Lowestoft Low Light	Now occulting.
32	" West Coast—South Stack Low (occasional) Light	Altered.
33	" Bristol Channel—Flatholm and Avon Lights	Altered: now occulting.
34	" Port of Bristol—Harbour Lights	Leading Lights for Kingroad Avon River.
35	IRELAND—South Coast—Queenstown	Alteration in buoyage.
36	" West Coast—Shannon River—Limerick—Braemar Point Light	Alteration in colour, and addit light.
37	NORTH ATLANTIC—Cape Clear	Dangerous floating wreck to ward.
38	NORTH SEA—Hook of Holland Canal—Western Channel	Range of visibility of leading l
39	" Netherlands—Ship Canal—Noordzee Harbour	Lights on mole heads.
40	" Ems River—Borkum Flat Light-vessel	Replaced in position.
41	" Jade River—Genus Bank	Light-vessel withdrawn and buoy placed.
42	" Elbe River—Mielstacks	Light re-exhibited, and addit light.
43	" Eider River—Inner Eider	Light-vessel not in position.
44	FRANCE—West Coast—Chenal du Four—Corsen Point	New leading light.
45	SPAIN—North Coast—Cape Higuera	Temporary light still exhibited lighthouse nearly complete
46	" North-West Coast—Cape Finisterre	Machinery now in order.
47	" South-West Coast—Cartaya River Bar	Leading lights altered in posit
48	MEDITERRANEAN—Spain—La Garrucha	Provisional light; proposed lighthouse.
49	" Sicily—West Coast—Trapani	Alteration in colour of Ron breakwater light.
50	" Adriatic—Port Budua	Mole light red; not white.
51	" Gulf of Patras—Patras	Intended harbour works; lights.
52	" Dardanelles	Buoyage.
53	" Karamania—Alaya	New light.
54	BLACK SEA—Roumella—Cape Eminch	New light.
55	NORTH ATLANTIC—Azores—Fayal Channel	Reported rock near Guia head
56	AFRICA—East Coast—Principe Islands	Reported shoal off Fogo island
57	INDIA—West Coast—Bombay—Kundari Island	Light to be altered in April.
58	" " Calicut	Temporary light; and pro new light.
59	MALACCA STRAIT—Malay Peninsula—Pulo Undan	New light.
60	EASTERN ARCHIPELAGO—Java—Sunda Strait—First Point	Provisional light.
61	CHINA SEA—Carimata Strait	Sunken danger.
62	" Approach to Balabac Strait—Mallawallé Channel	Sunken dangers.

MONTHLY ABSTRACT OF NAUTICAL NOTICES—continued.

No.	PLACE.	SUBJECT.
63	CHINA SEA—Min River Approach—Hebe Rock	Position discovered.
64	SOUTH AUSTRALIA—Spencer Gulf—Port Augusta—Snapper Point	Shoal buoyed.
65	AUSTRALIA—East Coast—Montagu Island	Provisional light.
66	" East Coast—Port Macquarie; Tweed River; and Endeavour River	Various: range of lights; and tidal signals.
67	PACIFIC COAST—United States—Oregon—Tillamook Rock and Point Adams	New light, and various changes.
68	SOUTH AMERICA—Dutch Guiana—Surinam River—Bram Point	Light-vessel altered in position.
69	" Venezuela—Orinoco River Bar	Temporary withdrawal of light-vessel.
70	WEST INDIES—Porto Rico—Port Ponce	New Light.
71	UNITED STATES—Florida—Fernandina Harbour	Bell buoy altered in position in N. Blue channel.
72	" Virginia—Thimble Shoal	Light re-established.
73	" Delaware River—Tinicum Island and Fort Mifflin Bar	New leading lights.
74	" " Schooner Ledge	New leading lights.
75	GULF OF ST. LAWRENCE—Prince Edward Island—Souris—Knight Point	New light.
76	NEWFOUNDLAND—South Coast—St. Pierre Island—Galantry Head	Character of light.
77	" East Coast—St. John's—Merlin Rock	Depth of water.
78	LABRADOR—North-East Coast—Hamilton Inlet	Breaker reported at entrance.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

29.—ENGLAND.—River Thames.—Sea Reach.—Alteration in the Character of the Chapman and Mucking Lights.—These lights have been made occulting. That at the Chapman will be under occultation twice in quick succession every half-minute, that is to say, it will suddenly disappear for three seconds, and then, as suddenly, reappear at full power for three seconds, again suddenly disappear for three seconds, and then reappear at full power for the remainder of the half-minute; and that at Mucking once in every half-minute, that is to say, it will, once in every half-minute, suddenly disappear for three seconds, and then, as suddenly, reappear at full power.

30.—ENGLAND.—*Thames Entrance.*—*Alteration in Character of the Smith's Knoll Buoy.*—One of Courtenay's automatic buoys has been placed in the position heretofore occupied by the Smith's knoll buoy. The buoy will still be of conical form and black in colour, but without staff and globe.

31.—ENGLAND.—*East Coast.*—*Alteration in the Character of the Lowestoft Low Light.*—The low light at Lowestoft has been made *occulting*, that is to say, it will, *once in every half-minute*, suddenly disappear for three seconds, and then, as suddenly, reappear at full power.

32.—ENGLAND.—*West Coast.*—*South Stack Low Light, North-West point of Holyhead Island.*—The alterations have been made in the South Stack low (*occasional*) light. Its present position is 195 feet W. by S. of the main lighthouse, and its elevation above high water 90 feet instead of 40. When shown, its period of revolution will be one minute, the same as the main light, instead of one minute thirty seconds, and the arc of visibility will be from S. 4° W. round westward to N. 53° E.

Note.—The low light will be exhibited in addition to the main light, in thick or foggy weather only, but mariners are cautioned that when a fog is partial it may happen that both lights will be visible, when, if they do not show simultaneously, they will appear as one light exhibited at irregular intervals.

33.—ENGLAND.—*Bristol Channel.*—*Alteration in the Character of the Flatholm and Avon Lights.*—These lights have now been made *occulting*.—That at the Flatholm will be under occultation *twice in quick succession every half-minute*, that is to say, it will suddenly disappear for three seconds, and then, as suddenly, reappear at full power for three seconds; again suddenly disappear for three seconds, and reappear at full power for the remainder of the half-minute. That at the Avon *once in every half-minute*, that is to say, it will, once in every half-minute, suddenly disappear for three seconds, and then, as suddenly, reappear at full power.

34.—ENGLAND.—*Port of Bristol.*—*Harbour Lights.*—On and after the 1st of February, 1881, there will be exhibited two *fixed green* lights, one on Dumball island, 13 feet high, and the other 750 yards to eastward thereof, 45 feet high, to give a lead through

Kingroad: the two lights in one, E. by S. Also a *fixed red light*, 18 feet high, will be placed 230 yards N.W. of the Avon light, as a guide for entering the river Avon.

35.—IRELAND.—*South Coast.—Queenstown Harbour.—Buoyage.*—Bar rock buoy (*cask*) is painted black and red in rings; and Cunard Company's buoy (between buoys Nos. 6 and 18) has been removed.

36.—IRELAND.—*West Coast.—Shannon River.—Limerick.—Braemar Point Light.—Alteration in Colour and Additional Light.*—In order to facilitate the navigation of Shannon river in the vicinity of Cock rock (about $2\frac{1}{2}$ miles below Limerick), the following alteration has been made in the light exhibited on Braemar point, south bank of the river:—The white light previously shown is discontinued, and in place thereof, a *red light* is exhibited. Also an additional *white light* is exhibited from a position about 85 yards in a N. by W. direction from Braemar point light.

Note.—These lights in line lead eastward of Cock rock. Variation, $23\frac{1}{2}^{\circ}$ W.

37.—NORTH ATLANTIC.—*Floating Wreck Westward of Cape Clear.*—The wreck of the *Cynosure* (stern gone, timber laden), has been reported in lat. $50^{\circ} 45' N.$, long. $18^{\circ} 45' W.$ —about 360 miles westward of cape Clear. This would be in the track of shipping bound into or out of St. George's channel. In this locality, the drift current may be considered to set in an E.N.E. direction (true), at the rate of about half-a-mile an hour.

38.—NORTH SEA.—*Hook of Holland Canal.—Western Channel Leading Lights, Range of Visibility.*—These lights should be visible from a distance of about 6 miles, or $4\frac{1}{2}$ miles seaward of the mole heads.

39.—NORTH SEA.—*Netherlands.—North Sea Ship Canal.—Noordzee Harbour.—Lights on Mole Heads.*—The Amsterdam Canal Company proposed to exhibit on 1st December, 1880, coloured lights (A and H) from the existing structures on the Outer mole heads, at the canal entrance, Noordzee (Ymuiden) harbour. These lights are arranged so as to burn for several consecutive days, when the mole heads are inaccessible from bad weather. On the same date, *white lights* (B and F) would be exhibited from

the existing structures on the North and South Crib heads; and the two red leading lights (B and C) as well as the two blue leading lights (F and G) previously shown, would be discontinued. The new harbour lights are *fixed* lights, and visible from a distance of 2 miles, as follows:—North mole head light (A) shows *red* seaward, *green* inshore; South mole head light (H) shows *green* seaward, *red* inshore; North Crib (B) and South Crib (F) lights are *white* lights.

Caution.—While going to press we have received an intimation that these lights have been suspended, and that the old lights have been re-established; whether permanently or not we are unable to say. Caution is therefore necessary on approaching the North Sea Ship Canal.

40.—NORTH SEA.—*Ems River.*—*Borkum Flat Light-Vessel.*—On 29th November, 1880, this light-vessel was replaced in position.

41.—NORTH SEA.—*Jade River.*—*Genius Bank Light-Vessel Withdrawn.*—*Gas Buoy Placed.*—On 10th December, 1880, Genius bank light-vessel would be withdrawn, and on the same date, or as soon afterwards as the weather permitted, the light-vessel would be replaced by a gas buoy. The buoy (*conical*), painted red, with the word *Genius* on two sides, is 8 feet in diameter at the water-line, and 8 feet in height. The light (*white*), shown from an iron support above the buoy, is elevated about 13 feet above the water.

Note.—When the ice begins to drift, this buoy will be withdrawn.

42.—NORTH SEA.—*Elbe River.*—*Mielstacks Light Re-exhibited, Additional Light.*—On 1st December, 1880, the light, which had been temporarily discontinued, near Mielstacks, south bank of Elbe river, was re-exhibited. In order to mark more distinctly Mielstacks light (fixed white), indicating the fairway between Schulau light-vessel and the two white buoys 2 A and 2 B, a *fixed green* light of small power is now exhibited on the north side of Mielstacks light.

43.—NORTH SEA.—*Eider River.*—*Inner Eider Light-vessel not in Position.*—This light-vessel left her station on the 12th December, 1880.

44.—FRANCE.—*West Coast.*—*Chenal du Four.*—*Leading Light on Corsen Point.*—Exhibited from a small structure recently added to the south wall of the Semaphore building on Corsen point. It is a *fixed white* light visible through a sector of 8° , indicating the channel between Grande Vinotière to the westward, and Petite Vinotière and Basse des Renards to the eastward—elevated 105 feet above high water (5 feet above the ground), and visible from a distance of 14 miles. Position, lat. $48^{\circ} 24' 55''$ N., long. $4^{\circ} 47' 45''$ W.

Note.—Mariners navigating the southern part of Chenal du Four should keep this light in sight—remembering that Basse du Chenal (westward of St. Mathieu point and marked by a red buoy) is in the centre of the illuminated sector.

45.—SPAIN.—*North Coast.*—*Cape Higuera Light.*—The temporary light (fixed, and visible in clear weather from a distance of about 10 miles) was re-exhibited on 1st November, 1880, and will continue to be shown until 30th April, 1881, unless directions are given to exhibit the light from the new lighthouse now approaching completion.

46.—SPAIN.—*North-West Coast.*—*Cape Finisterre Light.*—The fitting of new machinery to the revolving light at cape Finisterre has been completed, and it now acts with due regularity. The apparatus revolves completely every eight minutes, and the light (white) is described as giving *alternate flashes and eclipses every thirty seconds.*

47.—SPAIN.—*South-West Coast.*—*Cartaya River Bar Leading Lights.*—*Alterations in Position.*—Consequent on Cartaya (Terron) river bar having shifted, the position of the leading lights (fixed white) for crossing it have been altered, and are now in line when bearing N. $\frac{1}{4}$ W. These lights are situated 784 yards eastward of Rompido lighthouse, 120 yards from the shore, and 437 yards from the bar. The high and most northerly light is elevated 66 feet above high water and 38 feet above the ground; the low light 56 feet above high water and 23 feet above the ground.

Note.—Cartaya river bar is subject to frequent changes which require alteration in the line of the leading lights.

48.—MEDITERRANEAN. — *Spain.* — *Provisional Light at La Garrucha.*—It has been decided to remove Villaricos light to

La Garrucha, and until the completion of the new lighthouse, a light would be provisionally exhibited on the castle of Jesús Nazareno, which does not noticeably differ from the intended permanent light. The permanent light will be elevated 63 feet above the sea, and should be visible from a distance of 9 miles. The new lighthouse will be of dark colour, with keeper's dwelling in front, and will be situated between the town of La Garrucha and the castle of Jesús Nazareno. Position, lat. $37^{\circ} 10' 15''$ N., long. $1^{\circ} 49' 0''$ W.

49.—MEDITERRANEAN.—*Sicily.*—*West Coast.*—*Trapani Harbour Light.*—*Alteration in Colour.*—Exhibited from the extremity of Ronciglio breakwater. The light is now *green* instead of white as previously.

50.—MEDITERRANEAN.—*Adriatic.*—*Port Budua.*—*Light on Mole.*—The light exhibited from the extremity of the mole at port Budua is *fixed red*, not white as hitherto stated.

51.—MEDITERRANEAN.—*Gulf of Patras.*—*Patras.*—*Intended Harbour Works, Lights.*—Information relative to the intended construction of a breakwater and mole at that place:—Two beacon posts have been placed, 562 yards apart, indicating the direction of the intended breakwater—one 164 yards northward of the lighthouse on the mole (St. Nicolas) head; the other 392 yards northward of the shore, opposite Kalavryta boulevard, whence the intended mole will be projected. Two *red* lights will be exhibited from these beacons. A line of buoys will also be placed about 54 yards seaward of the beacons, and mariners are cautioned not to come within that line, or approach too closely the harbour works.

52.—MEDITERRANEAN.—*The Dardanelles.*—*Buoyage.*—The buoys in the Dardanelles were in position in November, 1880, with the undermentioned exceptions:—Moussa bank buoy was $3\frac{1}{2}$ cables S.W. by W. of its proper position, in about 15 feet water. North Zindjir Bosan bank buoy was $2\frac{1}{2}$ cables E. by S. of its proper position, in 5 fathoms water. In both these cases, a vessel passing close to the buoys on the channel side, would be endangered—close attention, therefore, should be paid to the leading marks. The buoys, with one exception (Nagara point—platform with cage), are small iron *nun* buoys; they were originally painted as shown

on the present charts of the Dardanelles, but are now of a reddish brown colour. The buoys generally are said to be occasionally out of position. *Variation*, $5\frac{1}{2}^{\circ}$ W.

53.—MEDITERRANEAN.—*Karamania*.—*Light at Alaya*.—On 15th December, 1880, a light would be exhibited from one of the towers of the old fortress at the extremity of cape Kiloarda, westward of Alaya anchorage. It is a *revolving* light with a *flash every minute*, elevated 393 feet above the sea, and visible from a distance of 20 miles. Position approximate on chart, lat. $36^{\circ} 31' 30''$ N., long. $32^{\circ} 2' 5''$ E.

54.—BLACK SEA.—*Roumelia*.—*Light on Cape Eminch*.—On 15th December, 1880, a light would be exhibited from a lighthouse situated 50 feet from the extremity of the cape, northern approach to Burghaz bay. It is a *revolving* light with a *flash every thirty seconds*, elevated 207 feet above the sea, and visible from a distance of 20 miles. Position approximate on chart, lat. $42^{\circ} 42' 30''$ N., long. $27^{\circ} 56' 15''$ E.

55.—NORTH ATLANTIC.—*Azores*.—*Fayal Island*.—*Reported Rock near Guia Head, Fayal Channel*.—The commander of the mail steam-vessel *Ville de Bordeaux* reports the existence of a rock, over which there is a depth of 9 feet, situated southward of Garça point (Guia head), the south-east extreme of Guia peninsula, about 120 yards from the land.

56.—AFRICA.—*East Coast*.—*Reported Shoal South-East of Primeira Islands*.—Captain Foot, H.M.S. *Ruby*, reports the existence of shoal ground lying about 8 miles south-eastward of Fogo island, Primeira islands. The British India steam-vessel *Socotra*, when proceeding southward, and in lat. $17^{\circ} 16'$ S., long. $39^{\circ} 00'$ E., passed over shoal ground in 8 fathoms; breakers at the time being observed at a quarter of a mile distant on the starboard-bow.

57.—INDIA.—*West Coast*.—*Bombay*.—*Kundari Island Light*.—*Intended Alteration*.—On 1st April, 1881, a sector of red light will be shown from Kundari (Kenery) island light, southern approach to Bombay. This sector will be visible between the bearings of N. and N.N.W. $\frac{1}{4}$ W., covering the dangers lying seaward of Alibagh and Choul, as also the Choul Kádu rocks. *Variation*, 1° E.

58.—INDIA.—*West Coast.*—*Calicut Light.*—*Intended Alteration.*—It is intended to exhibit a fixed white light at Calicut, in lieu of the light previously shown; and until the alteration is made, a temporary light would be exhibited from a platform in front of the lighthouse. The temporary light is elevated about 25 feet above high water, and visible from a distance of about 9 miles. Further notice concerning the permanent light will be given when the alteration is effected.

59.—MALACCA STRAIT.—*Malay Peninsula.*—*West Coast.*—*Light on Pulo Undan.*—On and after the 1st December, 1880, a light would be exhibited from a light-tower on Pulo Undan (Outer Water island), situated 10 miles S.E. by S. of Malacca flagstaff. It is an *intermittent flashing* light, showing *intervals of ten and twenty seconds*, elevated 155 feet above the sea, and visible in every direction seaward, from a distance of 20 miles. The lighthouse—built on the summit of the island, which is 100 feet high—is a square, two-storied structure, with an octagonal tower in the centre, on which the lantern is placed: the tower and balcony of the upper story are painted red; the remainder of the building is white. Position as given, lat. $2^{\circ} 8' N.$, long. $102^{\circ} 20' 30'' E.$

Note.—The fixed light at present exhibited from the tower on St. Paul's hill, Malacca, will be continued as a harbour light until further notice.

60.—EASTERN ARCHIPELAGO.—*Java.*—*Approach to Sunda Strait.*—*Provisional Light on First Point.*—With reference to notice respecting the reported destruction of the lighthouse on First point (Tanjong Koelong), an iron standard has since been erected, from which a *fixed white* light is now provisionally exhibited, visible from a distance of 9 miles.

61.—CHINA SEA.—*Carimata Strait.*—*Sunken Danger.*—Commander R. F. Hoskyn, H.M. surveying vessel *Flying Fish*, reports the existence of a sunken danger in Carimata strait, distant about 17 miles N. by E. from Nangka island. This danger (*Flying Fish shoal*) has 3 fathoms over it at low water, with depths of from 8 to 10 fathoms around at the distance of half-a-mile, and beyond that distance from 20 to 25 fathoms. Position, lat. $2^{\circ} 13' 20'' S.$, long. $108^{\circ} 38' 15'' E.$

62.—CHINA SEA.—*Approach to Balābac Strait.*—*Sunken Dangers in Mallawallé Channel.*—Commander C. Johnstone, H.M.S. *Egeria*, reports the existence of two sunken rocks lying near the fairway of the northern part of Mallawallé channel, south-eastern approach to Balābac strait. These dangers (*Egeria rocks*), on one of which the British steam-vessel *Royalist* is stated to have touched, are of a dark colour, and not easily seen, with depths of from 9 to 12 fathoms close around and between them. The southern danger is a pinnacle rock, with 4 feet over it at low water spring tides, lying with the following bearings and distance, viz.:—Islet north-west of Mallawallé island, N. 55° E.; Mallawallé island peak (562 feet), N. 81° E., distant $4\frac{1}{10}$ miles; south extreme of Mallawallé island, S. 70° E.; these bearings place the rock in lat. $7^{\circ} 3' 35''$ N., long. $117^{\circ} 19' 0''$ E. The northern rock is about 20 yards square with 3 feet over it at low water spring tides; it bears N. 40° E. from the southern danger, distant one cable. The north extreme of Mallawallé island and the south end of the northern off-lying islet just touching, leads about one cable south-eastward of *Egeria* rocks. The islet north-westward of Little Molleangan seen between Molleangan island and Little Molleangan (but nearer Molleangan island), leads northward of *Egeria* rocks.

Note.—The rocks, 30 feet high, lying in the southern part of Mallawallé channel, about $3\frac{1}{2}$ miles eastward of Silk island, are named Parankas. Variation, 1° E.

63.—CHINA SEA.—*Approach to Min River.*—*Reported Position of Hebe Rock.*—An unsuccessful search for this rock extending over two days, made by the boats of H.M. surveying vessel *Nassau*, in 1878, led, with subsequent information based on statements of the pilots for Min river, to its being removed from the charts. A pilot of Foochow, now reports its existence, and describes it as being a pinnacle with 17 feet over it at low water spring tides; the following approximate bearings were taken from a small boat near it, viz.:—Changchi island summit, N. by E. $\frac{3}{4}$ E.; Sharp shoulder, W. by N. $\frac{3}{4}$ N. These bearings place the assumed Hebe rock, with Sea Dog islet bearing N.E. by E. distant 2 miles nearly, or about $\frac{3}{4}$ of a mile W.S.W. from the position of it as originally reported. Variation, 1° W.

64.—SOUTH AUSTRALIA.—*Spencer Gulf*.—*Channel Leading to Port Augusta*.—*Buoy near Snapper Point*.—A tub buoy, surmounted with staff and ball painted red, has been placed on a patch having 14 feet on it at low water springs. It lies about 120 fathoms from the eastern bank, and 200 fathoms south of Snapper point.

65.—AUSTRALIA.—*East Coast*.—*Provisional Light on Montagu Island*.—Until the completion of the lighthouse now in course of construction, a light would be exhibited from the flagstaff on Montagu island (Barunguba). It is a *fixed white* light, visible from a distance of about 7 miles. Position approximate, lat. $36^{\circ} 15' 5''$ S., long. $150^{\circ} 14' 30''$ E.

66.—AUSTRALIA.—*East Coast*.—*Port Macquarie*.—(1.) *Tacking Point Light*.—*Range of Visibility*.—This light has been seen from a distance of 15 miles.

(2.) *Tweed River Entrance*.—*Fingal Point Light*.—*Range of Visibility*.—This light has been seen from a distance of 14 miles. Between the bearings of S.W. $\frac{1}{2}$ W. and W.S.W. it is obscured by Cook island.

(3.) *Endeavour River Entrance*.—*Cook Harbour*.—*Night Tidal Signals on Grassy Hill*.—The following tidal signals (indicating the depth of water on the bar) are now exhibited during the night from the flagstaff on Grassy hill. White light, 10 ft.; red light, $10\frac{1}{2}$ ft.; green light, 11 ft.; red light over white, $11\frac{1}{2}$ ft.; red light under white, 12 ft.; green light over white, $12\frac{1}{2}$ ft.; green light under white, 13 ft.; red light over green, $13\frac{1}{2}$; red light under green, 14 ft.; two red lights vertical, $14\frac{1}{2}$ ft.; two green lights vertical, 15 ft.; two red lights horizontal, $15\frac{1}{2}$ ft.; two green lights horizontal, 16 ft.; white light north, red south, $16\frac{1}{2}$ ft.; red light north, white south, 17 ft.; white light north, green south, $17\frac{1}{2}$ ft.; green light north, white south, 18 ft.; red light north, green south, $18\frac{1}{2}$ ft.; green light north, red south, 19 ft. During flood tide, a red light is shown northward of the permanent white light.

67.—PACIFIC COAST.—*United States*.—*Oregon*.—*Light on Tillamook Rock*.—*Characteristic of Point Adams Light changed, and Fog-signal discontinued*.—On and after February 1, 1881, there will be

shown from the lighthouse recently erected on Tillamook rock, off Tillamook head, a light showing a *white flash* every five seconds; elevated 136 feet above mean sea-level; and visible about $17\frac{1}{2}$ nautical miles. The tower is square in plan, rising from a rectangular dwelling, which has a fog-signal house attached on the westward side. The tower and dwelling are at present light gray, but will be painted white. The lantern and dome are red. The light illuminates the entire horizon, but the range of visibility upon safe water is between the bearings S.S.E. $\frac{1}{2}$ E., by the westward, to N. by W. $\frac{1}{4}$ W. Approximate position, lat. $45^{\circ} 56' 11''$ N., long. $124^{\circ} 1' 12''$ W. Bearings and distances of prominent objects are as follows:—Cape Disappointment light, N. W. by N. $\frac{3}{4}$ N., 20 nautical miles; point Adams light, N. by W. $\frac{3}{8}$ W., 15 nautical miles; Falcon rock, S.E. by S. $\frac{1}{4}$ S., $10\frac{1}{2}$ nautical miles. During thick and foggy weather there will be sounded at this station a *steam fog-siren*, given blasts of *five seconds* duration at intervals of one and a-half minute. The rock on which the lighthouse is situated is about one mile distant from the mainland, with an isolated rock just out of water about midway between it and Tillamook head. The least water close to either of the rocks is 15 fathoms; but no strangers should attempt the passage, as the currents are strong and variable. Vessels approaching Columbia river bar from the southward can pass, with safety, within half-a-mile of Tillamook rock, but it should not be brought to bear to the northward of N.N.W. $\frac{1}{4}$ W. After passing the rock at this distance, vessels should keep outside the line of bearings of Tillamook rock and cape Disappointment lights. On the exhibition of this light, the light at point Adams, mouth of Columbia river, will be changed to *fixed red*, instead of the flashing red and white light as now shown. The fog-signal at that station will, from the same date, be discontinued.

68.—SOUTH AMERICA.—*Dutch Guiana*.—*Surinam River Entrance*.—*Bram Point Light-Vessel*.—*Alteration in Position*.—This light-vessel has been moored with the following bearings, viz.:—Outer buoy, south; Bram point, S.E. by E.; eastern extreme of land, E. $\frac{1}{4}$ S. Variation, $\frac{1}{4}^{\circ}$ E.

69.—SOUTH AMERICA.—*Venezuela*.—*Orinoco River Bar*.—With-

dracawl of Light-Vessel.—This light-vessel, being useless, will be withdrawn, and it is proposed to replace it by a new one; during the interval, there will be no light-vessel or beacon of any kind on the bar.

70.—WEST INDIES.—*Porto Rico.*—*South Coast.*—*Light at Port Ponce.*—Exhibited from a small square tower erected on the upper part of the harbour master's office at port Ponce. It is a fixed red light, elevated 39 feet above the sea, and visible from a distance of 12 miles. Position approximate, lat. $17^{\circ} 58' 50''$ N., long. $66^{\circ} 39' 30''$ W.

Note.—Vessels approaching port Ponce should not come within 5 miles of the land, until the lighthouse bears N.N.E., which should then be steered for, passing westward of Tasmanian shoal—when abreast of Cardones islet, alter course to N. by E. for the anchorage. The fore and main-masts of a steam-vessel wrecked on Tasmanian shoal show two-thirds above water.

71.—UNITED STATES.—*Florida.*—*Bell Buoy, North Slue Channel, Fernandina.*—The bell buoy heretofore marking the north Breaker in the north Slue channel, entrance to Fernandina harbour, has been removed and remoored outside the bar, in five fathoms water, 200 yards south of the range for entering the said channel. A second class can buoy, red, marked No. 2, now marks the north Breaker.

72.—UNITED STATES.—*Virginia.*—*Thimble Shoal Lighthouse.*—*Re-established.*—The lighthouse on Thimble shoal, entrance to Hampton roads, which was destroyed by fire in October last, has been rebuilt. It shows a *fixed white* light for a period of one minute, followed during the next minute by six consecutive *flashes* at intervals of ten seconds, alternately *red* and *white*.

73.—UNITED STATES.—*Delaware River.*—*Schooner Ledge Leading Lights.*—Two leading lights are now exhibited from lighthouses erected below the Lazaretto, on the north bank of Delaware river, to indicate the channel through Schooner ledge. They are *fixed white* lights. The low light, elevated 37 feet above the water, is shown from a square red tower, on a white frame building, supported by iron piles, situated near the mouth of Crum creek. Position approximate, lat. $39^{\circ} 51' 15''$ N., long. $75^{\circ} 19' 50''$ W.

The high light is shown from an iron tower, 100 feet high, painted black, showing well above the trees, and situated in the valley of Darby creek, about $1\frac{1}{2}$ mile from the low light.

Note.—These leading lights in line intersect in deep water the line joining Cherry island low leading light and Christiana light, and are available thence to the point of intersection with Tinicum island leading lights—vessels must be careful not to pass beyond these points of intersection. The lights lead in the best water through Schooner ledge, passing eastward of Illinois rock, and about 25 yards westward of the staging erected to remove the rock obstructions. Until these obstructions are removed, the leading lights must be carefully kept in line.

74.—UNITED STATES.—*Delaware River.*—*Tinicum Island and Fort Mifflin Bar Leading Lights.*—Three lights are now exhibited from lighthouses erected on the south bank of Delaware river, to indicate the channels of two reaches—the first passing Tinicum (Little Tinicum) island, and the second through the dredged channel over fort Mifflin bar. The low light, which serves for both channels, is *fixed white*, elevated 30 feet above high water, and visible through an arc of 180° ; it is shown from a frame building with frame tower attached, situated about three-quarters of a mile below Billingsport. The building and tower are painted white, lantern red. Position approximate, lat. $39^{\circ} 50' 40''$ N., long. $75^{\circ} 15' 30''$ W. The eastern high light, which, kept in line with the low light, leads through the channel southward of Tinicum island is *fixed red*, elevated 100 feet above high water, and visible through an arc of 120° ; it is exhibited from an iron tower, 80 feet high, painted black, and showing above the trees. These leading lights in line intersect in deep water the line of Schooner ledge leading lights, and vessels can pass directly from the one to the other, taking care not to proceed beyond the intersection. Proceeding up the river, the lights should be kept in line until Fort Mifflin bar low leading light is visible, when the course should be altered two points to port. The western high light, which, kept in line with the low light, leads through the Cut over fort Mifflin bar, is a *fixed red* light, elevated 53 feet above high water, and visible through an arc of 120° ; it is shown from a

frame structure with frame tower attached ; the house and tower are painted white, lantern black. These leading lights should be kept in line, when proceeding down the river, until Tinicum island high leading light is visible, when the course should be altered one and a-half point to starboard ; proceeding up the river, they should be kept in line to the point of intersection with the Schnykill leading lights.

75.—GULF OF ST. LAWRENCE.—*Prince Edward Island*.—*East Coast*.—*Souris*.—*Light on Knight Point*.—Exhibited from a lighthouse erected on Knight point, about 100 yards south-eastward of the eastern breakwater at Souris, Colville river entrance. It is a fixed white light, elevated 85 feet above high water, and visible from a distance of 15 miles. The lighthouse, 45 feet high, is a square tower, painted white. Position, lat. $46^{\circ} 20' 50''$ N., long. $62^{\circ} 14' 30''$ W.

76.—NEWFOUNDLAND.—*South Coast*.—*St. Pierre Island*.—*Alteration in Galantry Head Light*.—The light exhibited on Galantry head, approach to St. Pierre harbour, is a revolving light, with two white flashes followed by a red flash every ten seconds.

77.—NEWFOUNDLAND.—*East Coast*.—*St. John's Harbour Entrance*.—*Depth on Merlin Rock*.—With reference to previous Notice on the increased depth (by blasting) over Merlin rock, in the entrance to St. John's harbour, Vice-Admiral Sir Leopold McClintock reports that the depth over the rock at low water ordinary spring tides, slightly exceeds 27 feet.

78.—LABRADOR.—*North-East Coast*.—*Breakers Reported off Hamilton Inlet Entrance*.—Staff-Commander Maxwell reports the existence of breakers situated seaward of south-east rocks, entrance to Hamilton inlet, Labrador. These breakers were seen by the master of s.s. *Labrador*, in September, 1880, when a heavy sea was running ; the southern of south-east rocks when in line with the breakers, bears W. by S. $\frac{1}{2}$ S., distant from them about $4\frac{1}{2}$ miles. Position approximate, lat. $54^{\circ} 18' 40''$ N., long. $56^{\circ} 44' 00''$ W. Variation, $41\frac{1}{4}^{\circ}$ W.

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE
HYDROGRAPHIC OFFICE, ADMIRALTY, 1880.

- No. 37.—NEW ZEALAND PILOT, Notice 7; information relating to parts of North island, Middle island, Cook strait, Auckland island, Campbell island, and Chatham islands.
- No. 38.—PACIFIC OCEAN, Notice 52; Southern and Western parts; information relating to various groups of islands and reef.
- No. 39.—EASTERN ARCHIPELAGO, Notice 19; information relating to the Sulu or Mindoro sea.
- No. 40.—MEDITERRANEAN PILOT, Vol. II., Notice 3; information relating principally to ports on the south coast of France, west coast of Italy, and the north coast of Africa.
- No. 41.—PACIFIC OCEAN, Notice 53; North-western part; remarks on Marshall and Caroline islands.
- No. 42.—CHINA SEA DIRECTORY, Vol. IV., Notice 10; information relating to the West coast of Saghalin island, the coast of Russian Tartary, the strait of Tartary, and the Amur river.
- No. 43.—WEST INDIA PILOT, Vol. II., Notice 11; information relating to Morant Cays.
- No. 44.—CHINA SEA DIRECTORY, Vol. IV., Notice 11; information relating to Quelpart island, Russian Tartary, and Japan.
- No. 45.—PACIFIC OCEAN, Southern and Western parts, Notice 54; information relating to various groups of islands and reefs.
- No. 46.—ST. LAWRENCE PILOT, Vol. 2; information relating to Pictou harbour.

CHARTS, &c., PUBLISHED BY THE HYDROGRAPHIC DEPARTMENT,
ADMIRALTY, IN NOVEMBER AND DECEMBER, 1880.

No.		s.	d.
878	Patagonia, west coast :—Port Henry	1	6
2398	The World :—Curves of equal Magnetic Variation	3	6
1440	Mediterranean :—Adriatic	2	6
877	South America, west coast :—Guia narrows to Conception channel (plans, Hugh bay. Landslip sound. Wide bay. Paroquet cove. Port Ochovario)	1	6

No.		s.	d.
879	South America, west coast :—Alert harbour. Kathleen anchorage and port Charrua... ..	1	6
709	Sumatra, west coast : Priaman to Oujong Indrapoera	2	0
888	Norway, south coast :—Sögnadalstrand and Bekefiord anchorages. Rasvaag and Kirkehavn anchorages. Approaches to Ekersund. Flekkefiord anchorages. Approaches to anchorages between The Naze and Farsund	1	6
560	South America, west coast :—Port Riofrio. Crossover island to Gorgon reef	1	6
2304	Plans added. Approaches to Bergen. Approaches to Lervig.		
2746	Plan added. La Rochelle.		
764	Plan added. Duke of York group.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No.	
479.	West Indies : Anchorages in Puerto Rico.
2602.	France, north coast :—Cherbourg.
360.	North Atlantic ocean :—Bermuda islands.
2804.	South America :—Plans on west coast of Patagonia.
2612.	France, north coast :—Trouville to Dieppe.
1313.	South America, Chile :—The channels between port de Ancud and port Montt.
554.	South America :—Magellan strait.
162.	Fiji islands :—Goro island.
850.	North sea :—Noordzee or Ymuiden harbour.
2691.	Pacific ocean :—Fiji islands.
2848c.	United States :—Chesapeake bay.
2819.	France, south coast :—Ciotat and St. Nazaire bays.
2119.	Australia, east coast :—Newcastle harbour.
946.	Borneo :—Malludu bay.

Book.—Tide tables for the British and Irish ports, &c., 1881 s. d.
1 6

OUR OFFICIAL LOG.

OFFICIAL INQUIRIES AT HOME, 1880-1.

797. *Kestrel*, s.s., and *Actif*, lugger; the former built at Newcastle, 1868; owned by the Cork Steamship Company; tonnage, 554; Antwerp to Glasgow; general cargo; the latter belonging to Etaples, near Boulogne; tonnage, 25; on a fishing cruise; in collision off Dungeness, October 15, 1880, when loss of life ensued. Inquiry held at Glasgow, November 20, 1880, before Rothery, Wreck Commissioner; Pickard, Kennedy, and Cowie, N.A. Both vessels in fault; the *Kestrel* for not keeping a good look-out, and the *Actif* for neglecting to exhibit a light. Mate of steamer cautioned to be more careful in future.

798. *Salopian*, barque; built at Maryport, 1841; owned by Capt. W. Robinson and another; tonnage, 277; Lisbon to Garston; phosphate of lime; abandoned at sea, October 24, 1880. Inquiry held at Glasgow, November 20, 1880, before Rothery, Wreck Commissioner; Kennedy and Cowie, N.A. The master (principal owner) to blame for the casualty, inasmuch as he took the vessel to sea in an unseaworthy condition; since deceased.

799. *Universe*, barque; built at Whitby, 1853; owned by Mr. W. Thompson and others; tonnage 847; Gefle to Sunderland; deals; lost on a rock off Ostergarms Holm Island, October 13, 1880. Inquiry held at Middlesborough, November 24, 1880, before Coleman, Judge; Hight and Curling, N.A. Master guilty of an error of judgment. Certificate not dealt with.

802. *Enmore*, s.s.; built at Stockton-on-Tees, 1872; owned by Mr. J. Holman, of Exeter; tonnage, 1,121; Montreal to Hamburg; rye; abandoned, and subsequently foundered, at sea, October 23, 1880. Inquiry held at Greenwich, November 26, 1880, before Balguy, Judge; Beasley and Anderson, N.A.; Lang, E.A. Loss attributable to damage caused by the vessel having struck the ground in the River St. Lawrence shortly before leaving Montreal.

803. *Swan*, s.s.; built at Low Walker, 1867; owned by Mr. John Ellis and others; tonnage, 753; Bilbao to the Tyne;

iron ore; stranded on Hasborough Sand, November 5, 1880. Inquiry held at Westminster, November 30, 1880, before Rothery, Wreck Commissioner; Hight and Clarke, N.A. Master in default in steering wrong courses, neglecting to use the lead, and for proceeding at full speed in hazy weather. The Court also found that no proper means were used to get the ship off, and that the abandonment was not justifiable. Certificate suspended for twelve months; recommended for one as mate during that time.

806. *Medina*, schooner; built at Cowes, 1822; owned by Mr. Thomas H. Williams; tonnage, 116; Bangor, County Down, to Canton; ore; supposed to have foundered at sea, September 8, 1880. Inquiry held at Liverpool, November 29, 1880, before Raffles, Judge; Grant and Vaux, N.A. Probably lost in a gale of wind; but was not in a seaworthy condition when she left Bangor.

807. *Fitzjames*, s.s.; built at Glasgow, 1877; owned by Mr. William Burrell and others; tonnage, 686; Glasgow to Genoa; pig iron and general cargo; stranded on Skulmartin Reef, November 4, 1880. Inquiry held at Glasgow, November 26, 1880, before Stewart and Blackie, J.P.; Foster, Powell, and Murdoch, N.A. Master in default for neglecting to use the lead, and for not remaining on deck when the safety of the vessel required his supervision. Certificate suspended for six months.

808. *Killeena*, barque; built at Partick, 1875; owned by Mr. William Newton and others; tonnage, 795; New York to Liverpool; Indian corn and cotton; abandoned at sea, October 10, 1880. Inquiry held at Glasgow, November 24, 1880, before Rothery, Wreck Commissioner; Alpin, Ward, and Parfitt, N.A. Accident due to faulty stowage of cargo, and Court held the abandonment to have been premature. Master to blame. Certificate suspended for six months.

809. *Neptune*, s.s.; built at Govan, 1860; owned by Messrs. J. & P. Hutchinson; tonnage, 282; Galway to Glasgow; hay, &c.; stranded at Kilroe, Galway Bay, November 7, 1880. Inquiry held at Glasgow, November 30, 1880, before Mirrlees and Miller, J.P.; Ward and Comyn, N.A. Master guilty of an error of judgment. Admonished to be more careful in future.

815. *Cornucopia*, brigantine; built at Prince Edward Island, 1870; owned by Mr. J. Powell; tonnage, 181; Bilboa to Swansea; iron ore; lost in Santona Harbour, November 3, 1880. Inquiry held at Swansea, December 10, 1880, before Fowler, Judge; Castle and Vaux, N.A. Casualty caused by vessel dragging her anchor. No blame attached to master.

816. *Robinia*, *Stag*, and *Benalla*, steamships; the first built at Low Walker, 1877; owned by Mr. J. Robinson and others; tonnage, 1,180; New Orleans to Havre; wheat; the second built at Sunderland, 1874; owned by Mr. J. Robinson and others; tonnage, 1,005; New Orleans to Marseilles; wheat; and the third built at Liverpool, 1880; owned by Mr. J. Hoult and others; tonnage, 785; New Orleans to Bayonne; wheat; in collision in the harbour of St. Michael's, Azores, October 2, 1880, when all three vessels were lost. Inquiry held at Newcastle, December 4, 1880, before Rothery, Wreck Commissioner; Grant, Curling, and Ward, N.A. Court held that no blame attached to any of the masters or crews, but that the master of the *Robinia* committed an error of judgment in not laying out an anchor on his port quarter.

819. *Hardwick*, s.s.; built at Stockton-on-Tees, 1873; owned by Mr. T. Appleby and others; tonnage, 618; Odessa to Bristol; barley; foundered at sea, September 1, 1880, when eighteen lives were lost. Inquiry held at West Hartlepool, December 8, 1880, before Rothery, Wreck Commissioner; White and Harland, N.A. Loss due to the vessel being too deeply laden, and to her want of stability.

820. *Mercury*, s.s.; built at Port Glasgow, 1876; owned by Messrs. J. & P. Hutchinson; tonnage, 282; Youghal to Bordeaux; oats, &c.; foundered at sea, November 3, 1880, when four lives were lost. Inquiry held at Glasgow, December 8, 1880, before McLean and Somerville, J.P.; Grant, Ward, and Corrie, N.A. Accident due to the vessel wanting stability, in consequence of improper stowage of cargo. No blame attached to master or officers.

821. *Hannah G*, brigantine; built at New Brunswick, 1865; owned by Mr. R. S. McMorland; tonnage, 247; Miramichi to Irvine; timber; abandoned at sea, October 30, 1880. Inquiry held at Liverpool, December 10, 1880. Casualty due to stress of weather.

822. *Maese*, brig; built at Yarmouth, 1841; owned by the master; tonnage, 206; Gefle to Sunderland; deals; lost by fire, September 28, 1880. Inquiry held at West Hartlepool, December 10, 1880. Master free from blame.

823. *Ringdove*, s.s.; built at Sunderland, 1871; owned by Mr. G. P. Forwood; tonnage, 516; Riga to Newport; sleepers; lost on the North Scroby Sand, November 16, 1880. Inquiry held at Liverpool, December 15, 1880, before Raffles, Judge; Wilson and French, N.A. Loss occasioned by the careless navigation of both master and mate. Certificates suspended for six months.

824. *Madeline*, s.s.; built at Hartlepool, 1874; tonnage, 845; Bolderaa to United Kingdom; railway sleepers; stranded off Staithes, November 23, 1880. Inquiry held at Middlesboro', December 14, 1880, before Coleman, Judge; Castle and Parfitt, N.A. Accident caused by the master making an error of half a point in the courses steered. Certificate not dealt with.

826. *Diamond*, s.s.; built at Dundee, 1877; owned by Mr. P. M. Duncan; tonnage, 401; Burntisland to Copenhagen; coals; stranded and lost on the Island of Anholt, Cattegat, October 29, 1880. Inquiry held at Dundee, December 4, 1880, before Lacon and Edward, J. P.; Cowie and Murdoch, N.A. Master deemed to have navigated his vessel incautiously. Warned to be more careful in future.

827. *Galatea*, ship; built at Govan, 1868; owned by Mr R. E. Graves; tonnage, 1,477; Liverpool to Bombay; coals; foundered off Cape Clear, November 16, 1880, when seventeen of the crew were drowned. Inquiry held at Westminster, December 17, 1880, before Rothery, Wreck Commissioner; Powell and Comyn, N.A. Loss due to cargo shifting, owing to improper stowage.

828. *Mavis*, s.s.; built at Hartlepool, 1872; owned by Messrs. J. V. Gooch and others; tonnage, 490; Cardiff to Bordeaux; coals; foundered in the Bay of Biscay, November 24, 1880. Inquiry held at Cardiff, December 17, 1880, before Jones, Judge; Forster, Pickard, and Clark, N.A. Accident caused by the negligent manner in which the vessel was navigated by the master. Certificate suspended for twelve months.

829. *John A Harvie*, barque; built at Newport N.S., 1876; owned by Mr. John A Harvie; tonnage, 1,035; New York to Dublin; maize; lost near Carnsore Point, November 25, 1880. Inquiry held at Wexford, December 21, 1880, before Ryan, Judge; Castle and Vaux, N.A. Casualty due to master mistaking the "Barrels" for the "Cardigan Bay" light-vessel. Master and mate free from blame.

830. *Louisa Ann Fanny*, s.s.; built at Cubitt Town, 1865; owned by Mr. Geo. P. Forwood; tonnage, 676; Riga to United Kingdom; sleepers; lost on Sand Hammar Point, Sweden, November 9, 1880. Inquiry held at Liverpool, December 21, 1880, before Raffles, Judge; Wilson and French, N.A. Accident due to unskilful navigation on the part of the second mate, and disobedience to orders of the master. Certificate suspended for four months.

834. *Arklow*, s.s.; built at Glasgow, 1861; owned by Mr. J. P. Kidston and others; tonnage, 500; Glasgow to Southampton; general cargo; lost near St. Alban's Head, November 19, 1880. Inquiry held at Glasgow, December 20, 1880, before Clark and Macfarlane, J.P.; Holt and Kennedy, N.A. Master in default for navigating in an unseamanlike and improper manner. Certificate suspended for six months.

837. *Latona*, barque; built at Port Dinorwic, Carnarvon, 1866; owned by Messrs. J. Bullock and others; tonnage, 270; Maceio, Brazil, to Liverpool; sugar, cotton, &c.; stranded on the Coal Rock, Anglesey, December 3, 1880. Inquiry held at Liverpool, December 24, 1880, before Raffles, Judge; Wilson and French, N.A. Accident due to the master miscalculating his position, giving a wrong course, and not using the lead. Master censured.

831. *Cavan*, s.s., and *Vigilant*; the former built at Birkenhead, 1876; owned by the City of Dublin Steam Packet Co.; tonnage, 391; Liverpool to Dublin; cargo and passengers; the latter a fishing cutter; on a fishing cruise; in collision off the Bailey Light, November 19, 1880, when the cutter was lost, together with two of her crew. Inquiry held at Dublin, December 21, 1880, before O'Donnell, Judge; Aplin, Curling, and Murdoch, N.A. Casualty caused by the default of the mate of the *Cavan*, in not com-

plying with Article 17 of the Regulations for preventing collisions. Certificate suspended for three months.

839. *Huano*, barque ; built at Thomaston, U.S., 1850 ; owned by Mr. Thomas Steel ; tonnage, 843 ; Quebec to Troon ; timber ; suffered damage in a gale of wind, November 21, 1880. Inquiry held at Irvine, December 18, 1880, before Longmuir, Long, and Baird, J.P. ; Ward and Cowie, N.A. Accident due to stress of weather.

840. *Enterprise* ; built at Landport, 1879 ; owned by Mr. J. T. Crampton ; tonnage, 275 ; Portsmouth to Hartlepool ; ballast ; abandoned at sea, October 29, 1880. Inquiry held at Westminster, December 24, 1880, before Rothery, Wreck Commissioner ; Harris and Ronaldson, N.A. Abandonment somewhat hastily made, but not altogether unjustifiable. Master's certificate not dealt with.

841. *Maggie Cummins*, brig ; built at Egmont Bay, Prince Edward's Island, 1873 ; owned by the master and others ; tonnage, 294 ; lost whilst lying at Tupilco, Gulf of Mexico, October 5, 1880. Inquiry held at Westminster, December 23, 1880, before Rothery, Wreck Commissioner ; Grant, Hight, and Beasley, N.A. Accident due to stress of weather. Master free from blame.

842. *Araby Maid*, built at Greenock, 1868 ; owned by Mr. William Thomson, jun. ; tonnage, 837 ; London to Port Chalmers, Otago ; general cargo and passengers ; stranded near Kingsdown Coast-guard station, November 18, 1880, when one life was lost. Inquiry held at Westminster, December 15, 1880, before Rothery, Wreck Commissioner ; Hight and Beasley, N.A. Accident caused by a vessel called the *Loch Fyne* being in the fairway, in an unmanageable state, and forcing the *Araby Maid* to pass under her stern, and from the anchor of the latter having been by mistake let go, and from the nature of the bottom failing to bring the vessel up.

843. *Anna P. Odell*, brigantine ; built at St. Andrew's, N.B., 1875 ; owned by Mr. W. Milner ; tonnage, 380 ; Sackville, N.B., to United Kingdom ; timber ; suffered material damage whilst at sea, November 14, 1880. Inquiry held at Liverpool, December 28, 1880, before Raffles, Judge ; Wilson and French, N.A. Vessel

water-logged owing to continued bad weather and heavy seas. Master exonerated from blame.

844. *Glencairn*, ship; built at Southwick, 1865; owned by Mr. J. Trattles; tonnage, 242; Shields to Rotterdam; coals; lost off the coast of Holland, November 29, 1880. Inquiry held at Sunderland, December 28, 1880, before McKenzie and Ritson, Judges; Ward and Vaux, N.A. Master miscalculated his distance and committed an error of judgment in not making more strenuous efforts to get the ship afloat after stranding. Cautioned to be more careful.

845. *Seadrift*, barque; built at South Hylton, 1865; owned by Mr. John Short; tonnage, 537; Tyne to Buenos Ayres; coal; supposed to have foundered at sea. Inquiry held at North Shields, December 23, 1880, before Shotton and Jackson, Justices; Aplin and Comyn, N.A. Not sufficient evidence to show from what cause the vessel has not been heard of since May last.

847. *Lively*, brig; built at Sunderland, 1838; owned by Mr. W. Davison, of North Shields; tonnage, about 800; Burntisland to Dordt; coals; abandoned at sea, November 10, 1880. Inquiry held at North Shields, December 23, 1880, before Baker and Jackson, Justices; Ward and Comyn, N.A. Abandonment justifiable.

848. *Impero*, barque; built at Londonderry, Nova Scotia, 1872; owned by Mr. R. Lewis; tonnage, 712; Philadelphia to United Kingdom; maize; abandoned at sea, November 8, 1880. Inquiry held at Liverpool, December 31, 1880, before Raffles, Judge; Castle and Harland, N.A. Abandonment justifiable.

849. *Estepona*, s.s.; built at Lanark, 1872; owned by Messrs. Massey and Sawyer; tonnage, 676; Cardiff to Marseilles; coals; supposed to have foundered at sea. Inquiry held at Cardiff, December 30, 1880, before Alexander and Paine, Judges; Pickard and Parfitt, N.A. Evidence not sufficient to show cause of loss.

850. *Stockbridge*, ship; built at Pallion, Durham, 1869; owned by Mr. Jas. Nourse; tonnage, 1,499; Liverpool to Calcutta; salt; abandoned at sea, November 16, 1880. Inquiry held at Westminster, December 16, 1880, before Rothery, Wreck Commissioner; Anderson and Harland, N.A. Loss due to stress of

weather and from the masts having been carried away, and which the crew were unable to cut clear of the ship's side, owing to the lanyards with which the rigging was set up being of steel. No blame attached to master.

853. *Norton*, barque; built at New Brunswick, 1862; owned by Mr. G. H. Coorse and others; tonnage, 530; Miramichi to Belfast; timber; abandoned at sea, October 29, 1880. Inquiry held at Belfast, December 13, 1880, before Lloyd, Judge; Forster and Kennedy, N.A. Abandonment justifiable.

856. *Cynosure*, barque; built at Bath, Maine, U.S., 1853; owned by Mr. William Cay and others; tonnage, 1,417; Quebec to Bristol; timber; abandoned at sea, November 29, 1880. Inquiry held at South Shields, December 31, 1880, before Broughton and Hall, Justices; Forster and Curling, N.A. Accident caused by stress of weather. No blame attached to master.

857. *Quorn*, ship; built at Kingston, Canada West, 1865; owned by Mr. Alexander Cassels and others; tonnage, 1,243; Greenock to New Orleans; ballast; beached by the master on Downhill Strand, Londonderry, December 19, 1880. Inquiry held at Liverpool, January 5, 1881, before Raffles, Judge; Hight and Castle, N.A. Vessel damaged by the severity of the weather. Master quite justified in beaching the ship for the safety of life.

OFFICIAL INQUIRIES ABROAD.

804. *Eastern Star*, brig; lost on Back Beach, Durban. Inquiry held at Durban, September 18, 1880. Loss due to parting of the cables in an easterly gale. Master free from blame.

805. *Victor*; brigantine; lost on Whale Point, Bahamas, October 26, 1880. Inquiry held at Bahama Island, October 27, 1880. In consequence of the leaky state of the vessel, master justified in running her ashore to save lives on board.

810. *Mahableswhar*, barque; lost on Ancutta Island, June 16, 1880. Inquiry held at Bombay, August 18, 1880. Court found master guilty of an error of judgment, and also of careless navigation. Certificate suspended for nine months.

811. *Norman McLeod*, barque; stranded at the mouth of the Chittagong River. Inquiry held at Chittagong, September 8, 1880. Master considered to have acted rashly. Censured.

812. *Active*, s.s.; grounded in the harbour of Pontallera, November 17, 1880. Inquiry held at Valetta, Malta, November 23, 1880. Master to blame for taking vessel into so exposed a harbour in such weather and for becoming intoxicated. Certificate suspended for three months.

813. *Atrunc*; lost. Naval Court held at Helsingfors, November 8, 1880. Master guilty of grave error of judgment. Severely censured.

814. *Glenavon*, s.s.; stranded near the Falsterbo Light, November 12, 1880. Naval Court held at Copenhagen, November 27, 1880. Master committed grave error of judgment. Severely reprimanded.

817. *Formosa*, barque; lost on the coast of New Jersey, November 10, 1880. Naval Court held at New York, November 27, 1880. Loss attributable to imprudent and faulty navigation on the master's part. Certificate suspended for three months.

825. *Susanne Godeffroy*; lost on the North Beach, Newcastle, N.S.W., when loss of life ensued. Inquiry held at Newcastle, October 5, 1880. Loss solely due to the unseaworthy condition of the vessel.

831. *Delambre*, s.s.; stranded at the mouth of the Mississippi. Naval Court held at New Orleans. Master guilty of imprudence only. Admonished to be more careful in future.

832. *Formosa*, ketch; in collision with a punt in tow of *Lillie Denham*, October 20, 1880. Inquiry held at Sydney, October 25, 1880. Accident due to error of judgment on the part of the master of the *Formosa*.

833. *Sarah and Mary*, ketch; stranded, and afterwards destroyed by fire, on the coast of Motuara Island, August 9, 1880. Inquiry held at Lyttelton, New Zealand, September 24, 1880. Master guilty of gross neglect in going to sleep in his cabin during his anchor watch. Ordered to pay costs of inquiry.

835. *Alexandra*, brig; stranded off Port Pirie. Inquiry held at Port Adelaide, October 20, 1880. No evidence adduced from which a charge could be made against the master.

836. *Sandringham*, s.s.; stranded on the Atlantic Coast, October 5, 1880; Naval Court held at Baltimore, December 9, 1880. Master acquitted of blame.

846. *Lord Sandon*, s.s.; lost near the Great Basses Light. Inquiry held at Galle, November 29, 1880. Master in default for sleeping during his watch on deck. Certificate suspended for eighteen months.

851. *Favor*, schooner; wrecked at King's Island, October 12, 1880. Inquiry held at Hobart Town, October 29, 1880. Master free from blame.

852. *St. Helen's*, ketch; lost on Black Reef, coast of Tasmania, October 2, 1880. Inquiry held at Hobart Town, October 10, 1880. Master warned to be more careful.

854. *Joan*, ketch; lost. Inquiry held at Hamilton-on-Forth, November 8, 1880. Master free from blame.

855. *Ben Ledi*, ship; lost on Pelsart Island, Abrolhos Group, December 16, 1879. Inquiry held at Geraldton, June 8, 1880. Master acquitted of incompetency or misconduct.

SIM'S PATENT BINNACLE LAMP.—Heretofore it has been customary to light the binnacle by side-lights. There is no objection, that we know of, to the light coming from the top, and if this can be done more efficiently and at less cost, so much the better. Captain Sim's patent proposes to do this and much more. The lamp is not wholly dissimilar to that of the railway carriage; it is said that it cannot be extinguished by wind, rain, or sea; that the light is uniform and good; requires no trimming during the night; and that the saving of oil in a year will repay the cost. Though the idea is not entirely new, it has never been efficiently tried until now. Those who have adopted it, prefer it much to the side-lights. We have seen many testimonials from masters of good repute speaking of it in the highest terms, and, if it is found to be superior to the old method of lighting the compass, by all means let it come into general use. We have no preference for old lamps if new lamps are better.

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THAMES PILOTAGE.

HE pilotage system now in operation for the conduct of vessels into and out of the River Thames, is regarded by many shipowners as unsatisfactory. From time to time dissatisfied feelings have found expression on the general subject, which have been met by small concessions, none of which appear to have satisfied the complainants. Now again the subject is brought forward through a different channel.

It will be remembered that the Committee appointed by the Board of Trade to consider the rules for regulating traffic in the navigation of the river Thames, took up, *inter alia*, the question of pilotage, and after examining numerous witnesses thereon, concluded by recommending the abolition of compulsory pilotage above Gravesend. As a sequence of that recommendation, it would seem that in a private Bill which the Conservators of the River Thames have introduced into the House of Commons for conferring further powers on themselves in connection with the navigation of the river, there is the following clause, viz. : "From and after the passing of this Act, the employment of pilots in the river above Gravesend shall not be compulsory, anything in the Merchant Shipping Act, 1854, or any other

enactment to the contrary, notwithstanding; and from and after the passing of this Act the master of any ship shall not be liable to any penalty imposed by the Merchant Shipping Act, 1854, or any other enactment upon the master of a ship, for not employing a qualified pilot, or for allowing an unqualified person, within the meaning of the same term in the said Act, to pilot such ship in the river above Gravesend."

Further, Mr. C. M. Norwood, M.P. for Hull, has given notice that, on the second reading of the Thames River Bill, he will move:—"That it be an instruction to the Committee, that they have power to create a distinct Pilotage Authority for the Port of London, representing its trade and commerce, in conformity with the recommendation in the report of the Select Committee on the Pilotage Bill, 1870."

It is evident that the question of Thames pilotage is about to be very fully discussed, and we hope it may lead to the complete throwing open of the pilotage of the river above Gravesend to all competent persons, so as to complete that which was tentatively commenced in 1873.

In order to place the subject before our readers in a plain and intelligible manner, and to assist discussion, we propose to state what is the actual condition of things at the present time.

In the first place, it will be well to understand that by compulsory pilotage, which is in force in the river Thames, is meant a system which, partly in order to provide for the safety of ships, and partly in order to secure employment and adequate remuneration for pilots, requires that all ships frequenting the port should employ them, and this compulsion is enforced by the Merchant Shipping Act, 1854, Section 353. But this compulsory system is largely modified by exemptions which have from time to time been allowed, as follows, viz. :—

(1.) Ships employed in the coasting trade of the United Kingdom.

(2.) Ships of not more than 60 tons burden.

(3.) Ships trading to Boulogne or to any place in Europe north of Boulogne (which has since been extended along the French coast as far as Brest).

(4.) Ships from Guernsey, Jersey, Alderney, Sark, or Man, which are wholly laden with stones being the produce of those islands.

(5.) Ships navigating within the limits of the port to which they belong.

(6.) Ships passing through the limits of any pilotage district on their voyages between two places both situate out of such limits, and not being bound to any place within such limits, nor anchoring therein.

(7.) All vessels in ballast voyaging between ports in the United Kingdom.

Further, this compulsory system is not in operation at all ports in this country, but here and there the voluntary system prevails, where no legal obligation compels a master to employ a pilot.

As regards the London district, with which Parliament is now asked to deal summarily, it is stated in a letter signed by the Secretary of the Trinity House, and addressed on the 5th March, 1879, to the Secretary of the Thames Traffic Committee, that owing to "legislation more or less contrarious, a state of great confusion exists." The Select Committee of the House of Commons, to whom, in 1870, a Bill for the Abolition of Compulsory Pilotage was referred, reported that, "In the London district the appointment and service of pilots is extremely complicated, and this complication, coupled with the system of compulsory pilotage and the numerous exceptions which have been made from it, has produced serious anomalies."

Again, in the report of the Thames Traffic Committee of 1879, we find it stated in reference to the pilotage of the river Thames, that "the state of things is full of anomalies," and that the law on the subject "is so full of exceptions that it is not easy to state clearly what it is."

Moreover, one need only read the evidence of shipowners and shipmasters given before the various committees which have enquired into the subject, to become aware how dissatisfied they are with existing arrangements.

This remarkable consensus of opinion indicates clearly that a change is urgently required, and seems to point to the desirability of extinguishing the compulsion to employ pilots, and to sweep

away the host of anomalies which have grown up around the pilotage system, with the ever-changing necessities of navigation and commerce.

There are actually no less than seven different classes of pilots now in existence in the London district, viz., those licensed to conduct vessels :—

(1.) From London to the sea and through the North or South Channels.

(2.) From Gravesend to the sea and through the North or South Channels.

(3.) South Channel from Dungeness to Gravesend.

(4.) North Channel from Orfordness to Gravesend.

(5.) Between London and Gravesend, up and down.

(6.) Between London and Gravesend, up and down, for Home trade passenger ships only.

(7.) Between London and Gravesend, for exempted vessels only.

No. 1 class is gradually diminishing, there being only thirteen pilots now holding licenses from London to sea. The starting point for the sea pilot is more properly regarded as Gravesend, and the bulk of such men are accordingly in Class 2, from Gravesend to sea, of whom there now are 87. Class 3 numbers 128, who are employed almost entirely upon inward pilotage through the South Channels. Class 4 contains 62 pilots, who also bring vessels inwards, but come through the North Channels.

All the foregoing are sea pilots, who go from or come up to Gravesend, but classes 5, 6 and 7 are all river pilots, who never go out to sea, and who simply conduct ships between London and Gravesend. No. 5 class are the old river pilots, of whom there are now 70; No. 6 are exclusively employed for Home trade passenger ships, numbering 22; and in No. 7 there are 120 pilots, who take charge of exempted ships only. It seems rather strange that a certain number of ships should be first exempted from the obligation to employ a pilot, and then that a special class of men should be licensed to pilot such ships between London and Gravesend.

It needs but little penetration to see that a reform in the direction of simplicity is desirable, and that the successive engrafting of

provisions to meet altered conditions, has produced a complicated and cumbrous character. For reasons have been expressed in former numbers of this journal, need not now be recapitulated, our sympathies are with the doing away of compulsory pilotage, wherever it meets favour its abolition. It seems now, that in the case of the obligation to employ a pilot above Gravesend, circumstances favour its extinction. Sundry committees have reported in favour of it; the shipowners clamour for it; shipmasters desire it; the brethren of the Trinity House "will not oppose it;" the system is in successful operation at various ports in the Thames; and it is found that when ships are exempted from the obligation, they do nevertheless frequently take pilots. Moreover, it is proposed to put an end to the vexed question concerning liability for damage when a vessel is in charge of a pilot in compulsory waters, by abolishing a scandalous abuse which has arisen in connection with the system, often in cases of collision, &c., the immunity of the shipowner established by the pilot accepting the responsibility, the pilot either becoming bankrupt, or sheltering himself behind a provision of the Merchant Shipping Act, whereby the pilot is liable for more than the amount of his bond of £100, which is held as a guarantee for the due observance of by-laws and regulations. Finally, it may be believed that, provided the vested interests of long-established pilots are fairly considered, there will be no serious opposition on their parts to the abolition, which need delay it any longer. It may safely be left to the local authorities to supervise the arrangements for meeting the special needs of navigation in respect of pilotage services, and to regulate that service with a due regard to the qualifications and standard of conduct on the part of the pilots, and we sincerely trust before long the laws of supply and demand may be allowed to exercise their legitimate sway, not only in regard to the service but to the pilotage all round the coast. We may rest assured that in such an event there would be no diminution in the number of qualified men, and free and fair competition would render the service far better than a system of artificial rules, and much more acceptable to the shipowner.

The subject of the rates of remuneration for pilotage services must necessarily be a most important element in the discussion of the general question. As a matter of fact, we believe that the London rates per mile are lower than the rates in force at many foreign ports. Steamship owners, we know, feel keenly that the rates for piloting steamers are disproportionately high as compared with the charges for conducting sailing ships, the former occupying so much less time than the latter; while, on the other hand, the pilots say that they get no more for a modern monster steamer of great value as regards her hull, &c., and carrying a cargo of immense worth, than for a sailing ship of half the value and capacity. These, however, are questions which adjust themselves much more satisfactorily in the open market than through the agency of any public department, however wise and qualified the individual members of such a department may be; and if the pilotage is thrown open above Gravesend, the question of remuneration of the pilots will thenceforth be left very much to solve itself under the healthy influences of competition and demand.

As regards the clause in the Thames Navigation Bill to which we have referred, it must be said that in its present form it is extremely crude, and, probably, impracticable. By an arbitrary Act it would sweep away an existing system which has many roots and fibres in the soil in which it has grown. The proposal is to abolish the compulsion to employ a pilot in the Thames above Gravesend, and also the penalty to which a master is now liable if he allow an unqualified man to pilot his vessel. In our opinion this penalty should remain. Let a master, if he can and chooses to do so, navigate his vessel through the pilotage waters above Gravesend, let him take the responsibility of so doing; he is the only man on whom such responsibility should rest; he holds a certificate of competency as regards seamanship and navigation, and is responsible to his owners for the safety of the ship. But if he feels himself incompetent to conduct his ship in certain waters, and voluntarily chooses to call in the aid of a pilot, it is only fair that the man who offers himself as a pilot should also be possessed of a certificate or license testifying to his

etency to undertake so responsible a duty ; a safeguard of kind is essential for the protection of life and property. But at the same time let any number of pilots be licensed who can prove themselves to be qualified, and let the terms be a matter of agreement between owner or master and pilot. It should be noted that in view of the much larger number of men who would probably obtain licenses, it would be very necessary that rules should be strictly enforced, that requirements, as regards character, and conduct, should be uncompromisingly adhered to, and that default should be followed by withdrawal of the license. This would assist, in great measure, in keeping together a respectable body of men, and with a judicious exercise of power and discretion by the authorities, would effectually weed out the bad characters. In thus throwing open the pilotage service we feel confident that good pilots would not suffer at all by the change. It would abolish a standing grievance of the shipowner, and would place the pilotage service on a better footing altogether. It is remarkable that, in the Thames River Bill, everything is to be swept away, and nothing is provided in place. No thought seems to have been given to the necessity of making some provision for the orderly conduct of pilotage in the river, which is sure to be necessary, notwithstanding the abolition of the obligation to employ a pilot. Nor is there any reference whatever in the clause to the interests of pilots now existing, and who have specially given their lives to this profession. It is out of the question to suppose such interests should be altogether ignored ; but nevertheless, the matter is completely ignored in the Thames Conservators' Bill.

On the whole, it would seem to be the wisest course, in admitting the principle of the clause, for the House of Commons to refer the question to a select committee, with an instruction that the clause should be made to contain the necessary provisions for making the proposal more practicable and more palatable. If this were done, no doubt the clause would lose something of its present nakedness, and would certainly be received with less opposition than in its present condition.

Mr. Norwood's motion appears to us to be somewhat beside the

question with which we have been dealing. The present pilotage authority of the port of London stands high in public estimation, and the Thames Traffic Committee in their report of 1879 say, "that considering the great experience and qualifications of the Elder Brethren in matters of pilotage, your committee think that the management of pilots cannot be placed in better hands than theirs." And with this opinion, no doubt, the majority of our readers will heartily coincide.

Since the foregoing was written we are glad to observe that our views are completely in accord with those expressed by the Hon. Evelyn Ashley, M.P., Parliamentary Secretary of the Board of Trade, at the Annual Meeting of the United Chamber of Shipping, and in reply to a deputation of steamship owners who waited upon him at the Board of Trade. It seems evident now that compulsory pilotage above Gravesend will be abolished, and that a select committee will probably modify the clause in the Thames River Bill after the principle is admitted, so as to provide for the regulation and supervision of the system as it will exist in a free state, for the consideration of the interests of existing pilots which may be prejudiced by the coming change, and for the maintenance of the Trinity House Corporation as the pilotage authority for the Thames.

THE FRENCH MERCHANT SHIPPING BILL.

HE Bill for the encouragement of French merchant shipping has at length been made law, and the French shipbuilder and shipowner are now protected from the rude jostling of ordinary competition by means of State bounties. That the scheme should have become an accomplished fact will not cause much surprise on this side of the channel. For some months past English shipowners have regarded the adoption of the proposed enactment as a foregone conclusion, and they are now face to face with the evil. The following is the text of the measure as finally adopted:—

"Article 1. The right of free pilotage is granted to all sailing-

vessels not measuring over 80 tons, and to steamers whose measurement does not exceed 100 tons, whenever they run regularly between port and port, and habitually frequent the entrances to rivers.

"Nevertheless, at the request of the Chambers of Commerce, and after an inquiry in the usual form has been made, public administrative regulations shall determine the modifications of the existing rules which may be considered necessary in the interest of navigation.

"Art. 2. For foreign-going vessels the visit of inspection prescribed by Article 225 of the Commercial Code for a fresh cargo loaded in France shall not be obligatory unless more than six months have elapsed since the last inspection, unless the vessels shall have sustained damage.

"Art. 3. For the official documents or *procès-verbaux* showing the changes of owners of the ship, either total or partial, a fixed charge shall be made for registration of 3 fr. Article 5, No. 2, of the Law of the 28th February, 1872, is repealed so far as it is contrary to the present provision.

"Art. 4. To compensate shipbuilders for the charges fixed by the Custom House tariff, the following allowances shall be made to them :—

"For iron or steel vessels, 60 fr. per ton gross measurement.

"For wooden vessels of 200 tons or more, 20 fr.

"For wooden vessels of less than 200 tons, 10 fr.

"For composite vessels, 40 fr.

"For engines placed on board steamers, and for auxiliary apparatus, such as steam-pumps, donkey-engines, winches, ventilators worked by machinery, also their boilers and pipes, 12 fr. per 100 kilog.

"Ships planked with timber, having beams and ribs of iron or steel, are to be considered as composite vessels.

"Art. 5. Every change in a ship by which an increase in measurement is gained shall give right to a bounty, based on the above Tariff, according to the increase of tonnage gained.

"The bounty shall be granted for driving-engines and auxiliary apparatus placed on board after completion of the ship.

" On change of boilers, the owner shall be allowed a compensation allowance of 8 fr. per 100 kilog. on new boilers, weighed without the tubes, if of French make.

" Art. 6. The allowances granted by Articles 4 and 5 shall be paid, on delivery of the French register, by the Receiver of Customs at the nearest place of construction.

" Art 7. The system of admission duty free, fixed by Article 1 of the Law of the 19th May, 1866, and by Article 2 of the Law of the 17th March, 1879, is abolished.

" Art. 8. Shipbuilders shall receive allowances for vessels on the stocks at the time when the present law shall come into force, as stipulated in Article 4, after deducting the amount of Customs dues fixed by the Conventional Tariff on foreign imports which may have been entered free of duty for shipbuilding purposes.

" Art. 9. As compensation for charges imposed on the mercantile navy for the recruitment and service of the military navy, a navigation bounty shall be granted, during ten years from the date of publication of this Law, to all French vessels, sailing or steam.

" This bounty is applicable only to foreign-going vessels.

" It is fixed at 1 fr. 50 c., per register ton and per 1,000 miles run for vessels of French construction fresh off the stocks, and decreases annually by—

0·075 fr. for wooden vessels ;

0·075 fr. for composite vessels ;

0·05 fr. for iron vessels.

" For foreign-built vessels, the bounty is reduced to one-half of the above assigned amount.

" Vessels taking out French Registers before the promulgation of the present Law, are assimilated for bounty purposes to vessels of French construction.

" The bounty is increased by 15 per cent. for steamers built according to plans previously approved of by the Marine Department.

" The number of miles run is calculated according to the distance from the point of departure to the point of arrival, measured on a direct maritime line.

"In case of war, merchant-ships can be requisitioned by the State.

"Vessels engaged in the foreign and home fisheries ("la grande et la petite pêche,") those belonging to subsidized lines, and yachts, are excepted from receiving the bounty.

"Art 10. Every master of a vessel receiving one of the bounties fixed by Article 9 of the present Law shall be obliged to carry, free of charge, mails put under his charge by the Post Office authorities, or to be delivered to that Administration, as prescribed in the Consular Decree of the 19th Germinal, year X.

"If a Post Office agent is deputed to accompany the dispatches, he shall also be conveyed free of charge.

"Art. 11. A regulation of public administration, containing a special statement of the distances between ports, shall fix the system on which this Law shall be applied.

"The present Law, discussed and adopted by the Senate and by the Chamber of Deputies, shall be carried out as a State Law.

"Done at Paris, January 29, 1881."

As we pointed out in our September number, there can be no question that the new law is likely to have an injurious effect on certain sections of the British shipping trade. The immediate result of the promulgation of the scheme was to give a slight impulse to business in British yards. There was something like a rush made by French owners to obtain British-built vessels as soon as it became evident that the Shipping Bill would be made law, the tonnage of such vessels imported into France in 1880 being more than treble the amount imported in either 1878 or 1879. The cause of this sudden demand is to be found in the fact that only one-half the bounty on navigation allowed to French vessels by Article 9 will be granted to foreign-built vessels in future. The full bounty is to be paid for vessels of this class only in cases in which they were registered in France prior to the promulgation of the new law.

British shipowners may well be excused for the apprehension with which they have viewed this attempt to bolster up the French shipping industry. Certainly, if we may judge from its present condition, this industry is one that seems to stand in need of some

stimulus or reviving influence. However widely opinions may differ with regard to the means adopted by our neighbours for adding to their Mercantile Navy, there is clearly much room for improvement. At present, France can hardly be said to possess a Mercantile Marine commensurate with her position among European nations, seeing that, in this respect, she is distanced by several of her neighbours. The only ground for astonishment is that the French, with their inveterate belief in the efficacy of State assistance, did not have resort to the paternal system of government bounties before.

The Senate Committee, who were appointed to inquire into the provisions of the new Bill, drew a gloomy picture of the present condition of the French Mercantile Marine. They pointed out that it is in a state of constant decadence, that each year the shipbuilding yards are losing their importance, and that, if the existing state of affairs continues, France will soon be without any foreign-going Mercantile Navy other than that consisting of her subsidised postal lines. They then ask whether the country is to look with indifference upon the ruin of her over-sea mercantile fleet, and to calmly resign herself to the closing of her building yards. They argue that these impending evils will be averted by the adoption of the new law, and this without striking any blow at the principle of Free Trade, or throwing any artificial or unfair obstacles in the way of foreign competition.

It will be observed by Article 9 that the Bill is passed for a period of ten years only. Its authors, no doubt, presume that by the expiration of that period, the French Mercantile Marine bantling will be able to walk without the aid of its nurse. But if such an expectation has been formed there is every reason to believe that it will be seriously disappointed, and that in the absence of any political change, the system which has just been established will not live the present generation. The paths leading to State protection are downhill and pleasant travelling, but the return journey is arduous in the extreme. Our neighbours are not without a good practical illustration of the impotence of the State to create a national industry of the natural and legitimate type. Their sugar trade, for example, has been petted and pampered from

infancy to old age, and still it is unable to stand of its own accord. British manufacturers naturally complain a good deal at the unfair terms on which they have to compete; but as yet they are tolerably well able to hold their own against French enterprise, both State and private combined. And we believe there is no reason to apprehend that in the case of the shipping trade the tables are about to be seriously turned upon us.

In the course of the debate on the Bill it was argued that the present naval supremacy of England is due in a great measure to the influence of Cromwell's Navigation Act. It is of course impossible to define the effect of any measure of this kind through a period of a couple of centuries with anything like certainty; but whatever may have been the general tendency of our old navigation laws, it is clear that there are other causes which may be regarded as sufficient to account for the high position which England holds as a maritime power. Her situation, the habits and character of her people, and the possession of important physical advantages which have entailed great national prosperity and a proportionate demand for the means of transport, are influences which dwarf all the Shipping and Navigation Laws that have ever been framed into comparative insignificance. These are the foundations on which England's maritime superiority is built, and as long as they all remain firm there need be no serious cause for alarm.

France may aspire to obtain a share in the general carrying trade of the world. The amount of freight to be earned is not unlimited, as English shipowners know to their cost; and, by the aid of State subsidies, the French will no doubt be able to obtain a certain proportion of the business now available. But at the same time they are not likely to become dangerous competitors. As matters now stand it would be futile to discuss the propriety of the step they have taken in saddling the national revenues with the partial construction and maintenance of a Mercantile Navy. The additional burden that is likely to be thrown upon their exchequer by the new law will not be a serious one, at least for some years; and if, in their desire to improve their position as a naval power, they are willing to tax themselves for the benefit of

the world generally, they cannot, of course, be prevented from doing so. The line of action they have determined on may be, as Earl Granville described it, "very foolish and absurdly contrary to sound finance and common sense," but that, after all, is a matter for their own consideration. Our chief concern is to consider the probable effect of the new system upon British shipping interests.

We do not apprehend that the bounty on construction is likely to seriously affect the shipbuilding trade in this country. That the French are not at present able to build many iron vessels is shown by the eagerness their owners have recently displayed in their endeavours to obtain English-built vessels. During the progress of the Bill through the Senate, an attempt was made to obtain the full navigation bounty for all vessels *ordered* abroad before the 1st January, 1881; but this proposition was negatived in favour of the restriction of the full allowance to vessels naturalized before the promulgation of the new law. But the fact that such an attempt was made, and that it was, moreover, vigorously supported, shows in which direction the wind has been blowing of late. Indeed, the Government appear to have been well aware of the transactions which were in progress. The measure was declared urgent, and the Minister of Commerce pointed out to the Chamber how desirable it was, in the interests of French shipbuilders, that the new law should be promulgated without delay, in order to prevent the transfer of a large number of foreign vessels to the French register. And the Senate Committee, in their report, submitted that it would be a great misfortune if the first result of the sacrifices made by the French Treasury should be to develop business in foreign building-yards, or to bring about the transfer to the French flag of old foreign vessels of an obsolete type.

There can be no question that the present resources of France for shipbuilding are comparatively insignificant. The total amount of shipbuilding built in that country in 1878 was only 21,000 tons, as compared with 470,000 tons built in the United Kingdom; and looking to the unrivalled superiority of British naval architecture, and to the advantages which England possesses in the shape of

cheap materials and trained labour, it seems highly improbable that the business of shipbuilding is about to migrate from our shores to any great extent. The bounty on construction is calculated to yield about fifteen per cent. on the cost of iron or steel vessels. Doubtless, this gives the French builder a considerable start in the competition for orders ; but although the allowance is a serious one, we do not believe that it is sufficient to out-weigh the naturally developed advantages which the English building trade enjoys. The probability is that the French will be somewhat better customers under the new state of things, than they have been under the old. The bounties are likely to cause some slight development in the French carrying trade, it is true, but we imagine that French owners will find it more to their advantage to purchase vessels in England, and rest content with half the navigation bounty, than to have them built in France for the sake of obtaining the full allowance.

It appears to us that, under the influence of the new law, and in spite of the precautions provided by Article 9, a considerable number of vessels will find their way from the British register to the French. The bounties will cause an immediate and increased demand for shipping on the other side of the Channel, and the consequence will be that they will open up a new market, in which our owners will be able to dispose of their available vessels at a price somewhat above the value they would otherwise have possessed. In this way a portion of the bounty will fall into British hands. There are plenty of British steamers which are by no means of an obsolete type, that can be disposed of at prices far below those at which similar vessels could be constructed in France, and as fast as these are transferred, their places can easily be filled by new ones from our own yards.

So far as British interests are concerned the new law seems likely to have a detrimental effect on the business of the shipowner rather than on that of the shipbuilder. Fortunately for England, our neighbours never have possessed a natural aptitude for the sea. Had they been "born sailors," like the Norwegians or the Dutch, the necessity for bounties on shipping would not have urged itself upon their attention ; and we cannot believe that these

artificial aids to enterprise are about to work any great revolution in their tastes and habits. The unequal competition with which we are threatened foreshadows its own remedy. The French Mercantile Marine could not seriously affect the British carrying trade without first undergoing a large development, and no great increase could take place without entailing a fiscal burden that would soon become intolerable to the nation at large. As soon, therefore, as the evil became serious, the artificial stimulus would be withdrawn and, unless the national characteristics had in the meantime undergone a considerable revolution, matters would then resume their normal state. In the course of the agitation raised in this country against the bounty system, it was suggested that British capital and labour might be tempted to migrate in order to obtain the bribes offered by the French Government; but such a movement is not likely to take place, as the new law requires that the subsidized vessels shall be owned by French subjects, to the extent of at least fifty-one per cent. of their entire value.

It is to be feared that the movement just inaugurated by the French is only the commencement of the evil. Already there are sinister rumours that the United States and Germany contemplate the adoption of a similar system. If these reports should prove to be well grounded it will be impossible for our Government to do more than they have done in the present instance. The most ardent advocate of protection would hardly propose a resort to bounties on British shipping, and anything like retaliation is equally out of the question. We can do nothing but remonstrate and strive our best to make clear the fact that industries which are created and fostered by State subsidies and aids rarely acquire sufficient robustness to be able to dispense with all artificial help. The shipping industry is one that offers peculiar temptations to the advocates of protective duties and government grants. The possession of an extensive mercantile navy is an important consideration from a political point of view; and a nation may, therefore, be all the more readily persuaded into making some sacrifices for the purpose of gaining so valuable an adjunct to its power. Viewed in this light the subject may be made to lose somewhat of its economical character and to appear as one of the

highest State importance. The French Bounty Bill was greatly aided in its progress through the Chamber of Deputies and the Senate by arguments based on considerations of this kind, and it is to be feared that the Americans and Germans will be only too willing to regard the question from the same standpoint.

In the meantime we should deprecate anything like a show of alarm in this country. Loud protests against the threatened competition of foreign governments will only encourage our rivals in the belief that they are about to arrest the carrying trade from our hands. The prospect for British shipowners may not be a roseate one just now, but we believe British energy will pull us through against all odds. And if the State is unable to afford any positive and direct assistance in the struggle, it can, at all events, accomplish the same end by leaving the trade unfettered to the utmost possible extent. Of late years there has been a growing tendency to hamper the shipowner in his business by gradually extending the system of government interference, and by laying down specific rules with regard to the management of his affairs. It is evident, however, that if he is to hold his own in the unequal contest in which he will soon have to engage, he must be allowed to enter upon it with his hands comparatively free. The difficulties which beset him from abroad are serious; we must avoid creating artificial and unnecessary ones at home.

NOTICE RELATIVE TO THE SEAS COMPRISED BETWEEN CHINA AND JAPAN.

 THE French Hydrographic Office has published a useful discussion, with charts, by Lieutenant J. Revertégat, of the meteorology of these seas, based upon the observations made during 300 passages of the mail-steamers plying between Hong Kong, Yokohama, Nagasaki, and Shanghai, and upon those contained in the log-books of the French men-of-war, and various other sources.

With regard to the monsoons, it is found that they are far from being as regular as is generally supposed. The northern monsoon

has a very marked predominance over the southern, both as to direction and force. From the beginning of September the former is engaged in a struggle with the latter, and hardly ceases to predominate until the end of May ; while the southern monsoon, which is quite overcome during the course of October, only begins to make its approach felt in the month of April.

In the Formosa Channel, and along the coast of China, as far as the 30th parallel, the N.E. monsoon lasts really nine months of the year, attaining its maximum force in January and February, and, as regards locality, in the middle of the Formosa Channel, between Turnabout and Namoa. The S.W. monsoon only prevails during the three months, June, July, and August, in moderate breezes, without, however, displacing the N.E., which also blows in light breezes, becoming gradually lighter.

In the Eastern sea the wind is, at all seasons, much more variable ; in winter the prevalent direction is from N. to N.E. in the south, and from N. to N.W. in the north ; and it blows with a steady force, although less than that on the China coasts. In spring its general direction is turned towards the China coast, and its force is moderated ; in summer there is little wind, and it is extremely variable ; and in autumn the N.E. predominates everywhere.

On the eastern coast of Japan the wind has also much less constancy than in the Formosa Channel. During winter, the prevalent direction is certainly from N. to W., and it often blows with violence from this latter point ; but it is also particularly subject to variations, which, bringing winds, charged with vapour, from the open sea, make the weather bad. From the beginning of spring the S.W. wind establishes itself upon the S.E. coast, while the E. coast remains under the influence of the northerly breezes ; in summer the S.W. winds prevail, but are frequently interrupted by winds from N.E. to E., which are—unlike those of winter—the fine weather winds of the season ; lastly, from the beginning of September N.E. winds blow with much regularity, and these gradually give way to the N.W. breezes, in proportion as the difference of temperature increases between the land, which is cooling, and the sea, which the Kurosiwo always keeps at a rather high temperature.

In the Yellow Sea the wind is extremely variable at all seasons, which may be explained by the heating or cooling of the girth of lands which surround it. In winter only this wind has a rather marked general direction from north to south.

In the sea of Japan the wind follows nearly the same variations as on the Pacific Coast of China, except that in winter the N.W. has rather more strength, and the interruptions in its regularity are more numerous and violent.

Our space will not allow of our going farther into the subject beyond giving the following practical directions, drawn up by Lieutenant Revertégat from an examination of the charts and accompanying discussion, and relating to the navigation of the seas in question for the passages usually made.

From Hong Kong to Yokohama.—In winter, a steamer proceeding from Hong Kong to Yokohama should keep as close as possible to the China coast, taking shelter from the sea and the monsoon behind the islands and reefs which line the coast. This route is especially favourable between Namoa and the north of the channel, because it is here that the monsoon is felt in all its force; this route is followed by the packet-boats, and it presents no danger if proper use is made of the charts and instructions.

On leaving the channel it will be well to keep to the coast more or less, according to the strength of the monsoon, and then to shape a course in the Eastern Sea for the passage between Tokarasima and Yokosima (in the Linshotet Archipelago), in order to reach the Kurosiwo and the north-west breezes as soon as possible. From the Linshotet Archipelago a course should be steered so as to sight Oosima at a distance; the clear weather which prevails at this season allows of the land being followed at a distance, and consequently of advantage being taken of the strength of the Kurosiwo. In any case it will be well to approach Omae-saki, which has now a magnificent light, before standing in for Rock Island, which is low and sometimes difficult to recognise, and to the west of which the currents present some irregularity. These currents, which were probably the cause of the loss of the mail-steamer *Le Nil* upon the peninsula of Idzu, appear to be the resultant of the Kurosiwo and the tidal currents; they accordingly

change in direction and rate, according to the relative force of the two causes which produce them. From observations made round Rock Island, the Kurosiwo is sometimes simply checked by the flood tide; at other times this latter, in strong tides, succeeds in driving back the waters to the south-west, especially between Rock Island and the land. The ebb tide, on the contrary, always tends to increase the strength of the Kurosiwo. In any case, Fuji-yama will generally be, during the winter season, a valuable guide on all this coast; its cone, white with snow, is visible from a distance of 130 to 140 miles, and often more.

For a ship under sail the best route from Hong Kong to Yokohama during the N.E. monsoon is undoubtedly that which passes to the east of Formosa, as indicated by the instructions. The French men-of-war have made this passage in fifteen to sixteen days. For steamships, with a limited supply of coal or weak engines, which are obliged to reckon on their sails, this route is much to be preferred to that which leads through the centre of the Formosa Channel, where one may struggle for a long time unsuccessfully against the force of the wind and current. It was in following this last route that the *Cosmao*, on a voyage from Hong Kong to Yokohama, in the month of January, was obliged, after being more than fifteen days at sea, to put into Nagasaki, at which place she arrived after having completely exhausted her fuel.

In summer, on the contrary, the China coast should be left as soon as possible, in order to pass a few miles to the northern point of Formosa; from this point one should steer so as to run through the Linshotet Archipelago, between Tokarasima and Yokosima, the same as in winter; but now one should stand for Oosima, so as to sight it well, and from Oosima to Omae-saki and Rock Island. At this season of the year we should no longer depend upon Fuji-yama, because the atmosphere, clouded by evaporation, has lost a considerable amount of its transparency.

From Yokohama to Hong Kong.—During the winter, a steamer proceeding from Yokohama to Hong Kong should keep a few miles distant from the land to avoid the current and the heavy sea raised in the open by the strong breeze from west to north; at the same time advantage should be taken of the northing in the

direction of the wind caused by all the openings along the coast. The Van Diemen Straits should be entered by keeping along the coast of Kiu-siu, and in the Eastern Sea vessels should stand on a course to the north of that which would lead directly to the Formosa Channel, in order to lose as soon as possible the Kurosiwo; and should seek the N.E. monsoon, which we have only found to present force and regularity over a band of about 100 miles along the China coast; one should then steer before wind and current, keeping outside the islands of the China coast.

In summer the route from Yokohama to Van Diemen Strait should be about the same as in winter; if, in fact, the westerly breezes no longer exist, one should constantly be in readiness to avoid a typhoon, and the best way of avoiding it is to take refuge in one of the anchorages which the British Hydrographic Office has surveyed with this object. The fact that tacking is here almost impossible renders these storms full of danger, and a ship which suspects the approach of one should without hesitation seek a shelter before the weather gets so bad as to prevent it. After leaving Van Diemen Straits a direct course should be taken for the Formosa Channel and thence for Hong Kong.

From Yokohama to Hakodati and back.—In proceeding from Yokohama to Hakodati, it must not be forgotten that above Inaboye-saki the Kurosiwo meets the Oyasiwo which it turns to the west. All the vessels which have made this route by keeping along the coast above this cape, have been obliged to keep well to the east in order to counterbalance the effect of the Oyasiwo which carries them towards the land. The numerous sailing-vessels and steamers which have been lost to the north of Inaboye-saki must attribute their disaster to this set of the cold current upon the coast. In passing to the west of the lines of demarcation drawn upon the current charts, a ship will be carried to the land by the Oyasiwo, and by keeping to the east of it she will be carried seawards by the Kurosiwo. During foggy weather, which is frequent upon this coast in summer and spring, and during rainy weather, which is frequent throughout the year, the lead will here be a sure guide, and the temperature of the water will always indicate in which current the ship is. On this

passage one is also liable to meet with squalls of a certain violence, which principally occur along the line of contact of the warm and cold water, and are probably caused by the difference of temperature of the super-incumbent air. The gleam of the lightning generally indicates the direction from which the squalls will blow.

At the approaches to the Straits of Tsugar, where the warm waters issuing from the sea of Japan and the cold waters are again in contact, fog is also very prevalent. Here it is well to note a remarkable peculiarity which all captains take advantage of who frequent these parts; at about 10 miles to the north of Sirija-saki there are strong eddies of constant position, produced by the meeting of the currents; in foggy weather the junks and coast steamers wishing to enter the Straits of Sangar put to the north in order to take a point of departure, as certain as if with bearings, and then stand on the course for Hakodati.

In descending from Hakodati to Yokohama too much attention cannot be paid, in addition to the facts which we have just quoted, to the strength of the Kurosiwo between Inaboye-saki and the Gulf of Yedo; during summer, in fact, there is often a fog over the land, and if allowance is not made for the current, a ship may think she has passed Cape Mela and consequently stand on another course, which may easily result in the wreck of the vessel.

From Nagasaki to Hong Kong and back.—A ship proceeding from Nagasaki to Hong Kong in winter, wishing to meet with the N.E. monsoon as soon as possible, should stand in for the China coast a little below Chusan. The direct route does not allow of reaching it with certainty before the third or fourth day on a voyage of mean speed.

To proceed during the same season from Hong Kong to Nagasaki, one should keep along the China coast, within the islands, until beyond Fouchou at least, and then stand on the direct route.

For the summer season, the charts show nothing which could make another route preferable to the direct route.

Yellow Sea.—In the Yellow Sea the winds and currents present

such irregularity, that one can scarcely foresee at the time of undertaking a voyage, those which will be met with. It will always be necessary to distrust greatly the currents between the entrance to the Yang-tze and Cape Shangtung, where they have sometimes been found very strong, in one direction or the other, without apparent cause. These currents are the more to be feared, as the approach to the coast of the Yang-tze from the north is rather difficult; and, on the other hand, in August, September, and October, the vicinity of Cape Shangtung are subject to violent squalls, chiefly from the northwards, which completely obscure the horizon for many hours together.

Sea of Japan.—In the sea of Japan, one is liable to meet with violent squalls at all seasons, but especially in winter. The appearance of the sky at the point from which they are likely to blow and the gleam of the lightning, generally give warning of their approach; sometimes, however, they break out suddenly, and a ship under sail should always preserve the greatest vigilance. In proceeding from Hakodati to any point whatever of the coast of Manchouria, it is important to take into account the cold current which here comes down the coast of Asia, the more so, as this latter has a monotonous aspect which makes it difficult to recognise it. During foggy weather, so frequent in the fine season, and which the winds from seaward, saturated by the evaporation of the warm water, almost infallibly bring, the temperature of the water will indicate whether this current has been entered. On the other hand, when entering the Straits of Sangar by the Sea of Japan, it should be remembered that the current there regularly sets to the East with considerable strength, out of proportion to the breeze, and often exceeds 2 to 3 miles an hour.

Between Nagasaki and Vladivostock, a vessel should stand on the direct course, without approaching too near to the coast of Corea, where the tides are violent, and not yet well known. During the summer season, the vicinity of the Gulf of Peter-the-Great is frequently foggy, and before entering the channels one must absolutely wait for clear weather.

In descending the Western coast of Japan, the strength of the Western branch of the Kurosiwo may be avoided by keeping a

certain distance from the land. In ascending, on the contrary, a vessel will gain an advantage by keeping close to the land; but it is necessary always to be on guard against the violence of the Westerly breezes in winter, which may drive the ship ashore; and they also tend effectively to create a current setting towards the coast.

MADRAS HARBOUR AND PROPOSED CANAL ACROSS THE MALAY PENINSULA.

BE long the Madras Harbour will have been completed, and, with the advent of smooth water and the anticipated disappearance of the surf, a new order of things will be established; the traditions and habits of centuries will have been swept away, and the Masula boat and Catamaran have become things of the past. The great undertaking is fast approaching completion at a cost which has been estimated at £628,000, and though thus far it may be pronounced an engineering success, it remains to be seen whether it will equally prove to be a *financial* success also. That this is a problem difficult of solution, will, I think, be admitted by the mercantile public generally, upon whose shoulders the burden of paying for ways and means will be laid in a great measure. The dues upon shipping will have to be increased considerably, a heavy percentage on goods will doubtless also be a necessity; wharves and godowns will have to be constructed along the beach; the upkeep and repairs of the harbour piers maintained at a heavy cost, and, above all, the *interest* on the capital will be demanded by the Government of India.

The question then arises, how can these demands be met and in what way can the trade of the port be improved and developed so as to induce shipping to resort to it in a larger proportion than hitherto, and thus tend to the enhancement of the receipts from port dues and other charges. This is a question which ere long the Madras Chamber of Commerce will doubtless have laid before them for discussion. The revenue accruing from port dues and other charges at this port may be set down at Rs. 85,000 per

annum, while the interest alone on the principal expended on the harbour works would amount to Rs. 282,600 at $4\frac{1}{2}$ per cent. per annum. If a port trust should be finally decided on, the cost of establishment would be greatly increased and necessitate the levy of very heavy dues on both commerce and shipping, with the undesirable effect perhaps of driving away the latter from Madras altogether; for it must be admitted that the simple fact of the existence of a harbour at Madras is not likely to give any particular impetus to trade or increase the natural products of the country.

I therefore propose in this paper to consider the feasibility of bringing our port into direct communication with China, a plan which, if the physical aspect of the country to be operated on will permit of being carried out, even at a very great outlay, will doubtless tend to raise Madras to the proud position of a great commercial city and thus help to render our future harbour financially a success.

The newspapers of the day in discussing Central Asian politics frequently dilate on the importance of China as one of the three great Asiatic powers, more particularly in its relations with Russia; and an alliance between England and China has also been suggested, with a view to thwart the sinister designs of Russia on our north-western frontier. The subject therefore of promoting improved water communication between the two countries, with the object of accelerating the postal communication between Europe and China, is one of general importance to all nations, and particularly to Great Britain, in its commercial and political relations with the Celestial Empire.

The present mail route is *via* Brindisi, Suez, Bombay, and thence to Galle, Singapore, and Hong-kong. The line of navigation extends over a distance of 11,269 miles, and is supposed to be accomplished in 36 days from London. Now I would deferentially suggest as a *speedier* and *safer* route, that the mails be conveyed *via* Madras and across the Malayan peninsula instead of *via* Galle and the Straits of Singapore with their dangerous and intricate navigation. To effect this, it will be necessary to cut a canal across the peninsula, to connect the Gulf of Siam with the Bay of Bengal. This cutting I propose should be made from the right

bank of the Pakchan river, the entrance to which lies in lat. 10° north and long. $98^{\circ} 32'$ east. By utilizing the river (which is navigable at present to a great extent) to a distance of 30 miles, we arrive at a point not far off the town of Pakchan, and where the extreme width of the peninsula to the eastward is only 26 miles across. Of the navigation of the river itself and its locality, the Marine Survey Department, presided over by Commander A. D. Taylor (late I. N.), has recently obtained and published the fullest information, from which I cull the following notes.

The Pakchan river debouches into the Bay of Bengal in latitude 10° north, and separates British territory from that of the King of Siam. The river at its entrance is two miles wide and is navigable to a considerable distance, the depth in some places being 10 to 12 fathoms. Its banks are densely wooded on both sides, and numerous small rivers and creeks debouch into it. The principal of these on British territory is the Maliwoon river, called after the town of that name. Maliwoon is noted for its tin mines, which are located on high hills about 12 miles from the entrance of Maliwoon creek and about 25 miles from the entrance to Pakchan river. The B. I. S. N. Company's steamers call here once a month anchoring sometimes 5 miles up Maliwoon creek, and sometimes off Renong creek on the Siamese side. The town of Renong where the Rajah lives is rising in importance and exports a large quantity of tin from the adjacent mines. This town is in fortnightly steam communication with Penang and Rangoon. Fresh water and all kinds of provisions and firewood are obtainable here.

From the foregoing particulars, it will be seen that so far as the western outlet for the proposed canal is concerned, a sufficiently capacious and safe river is at hand to form the nucleus of operations and to which steamers of large size now find easy access. It will therefore be necessary to glance at the position which is proposed for the eastern outlet into the gulf of Siam.

From the town of Pakchan in a south-easterly direction and at a distance of 20 miles stands the town of Champong or Champoonie, in latitude $10^{\circ} 29'$ north, abreast of the bay of that name into which the Champoonie river debouches. The bay runs 3 miles north and south and is two miles wide. It is formed between a

projecting headland to the north called "Koh Quang" and the terminating headland of a range of hills extending in a north and south direction about 4 miles called the "Matsee Range." The river runs into the southern extremity close past the Matsee headland. The soundings in the bay range from 2 to 5 and 6 fathoms of water free from dangers to navigation. Of the river itself no information is obtainable, but from an inspection of the chart of the bay and its soundings we may safely infer that no great difficulties are likely to be encountered in order to open a suitable entrance to the canal from the bay to the river, and possibly to the town of Champoonie itself. Riding at anchor in the bay during the N.E. monsoon may be inconvenient, but there cannot possibly be a heavier sea than in our own roadstead during the same season. During the S.W. monsoon the anchorage would be quiet and safe.

It is now necessary to glance at the physical aspect of the peninsula between the Pakchan river and the town of Champong. Milner, in his *Universal Geography*, remarks that "the distinguishing aspect of the Malayan peninsula appears to be determined by chains of mountains running uniformly in the direction of the meridian inclosing distinct valleys no less uniform, each valley assuming a fan-like shape at the maritime extremity, and each the bed of a grand river system. Few regions exhibit such an amount of vegetable luxuriance, vast tracts being densely clothed with under wood and timber trees comprising teak, the iron tree, true ebony, the eagle wood, the white sandal wood, betel palms, and a great variety of aromatic and medicinal plants. The mineral wealth of the country is also very considerable, gold, silver, copper, and iron occurring in the mountains with many precious gems, rubies, sapphires, and amethysts." There may be insuperable difficulties in the way of a canal owing to the very mountainous nature of the country, but on examination there will doubtless be found valleys and rivers which could be availed of for making the cut, though the length of the canal itself may be thereby increased. The interior of the Malayan peninsula is, I believe, little known to and visited by European enterprise. But with the present interteam communication with the country up the Pakchan river,

it ought to be of easy access if by no other means than elephants, and the nature and resources of the track inland from sea to sea easily ascertained by competent surveyors.

The course of the Pakchan river is N. by E. $\frac{1}{2}$ E. to the town of Pakchan, while the town of Champong, which stands on the river of that name, is but 20 miles apart to the eastward on the east coast. This river, as indeed all the rivers on the peninsula, appears to have a northerly course from the coast and might be availed of for the run to the S.E. The Pakchan river runs to the north and west from the sea, while the Champong river runs south and east to the sea. Here then is all the material to hand for the construction of a waterway between the two seas by connecting the two rivers which do not appear to be more than 10 miles apart.

Should the physical aspect of the country be so mountainous as to preclude the possibility of constructing a canal, even then the scheme need not necessarily fail, as a railway would meet the difficulty. The construction of a railway in the Malayan peninsula is likely to be more remunerative than such a project has proved in Egypt; as here the country round is fairly populated, well wooded, rich in natural products, such as pepper, rice, cotton, sugar, and above all, teak timber, while tin and copper mines abound, and the elephant is available in large herds for the performance of heavy labour, and would be particularly useful in forest clearing operations. A railway in these circumstances is likely to prove more remunerative than one that runs through an uninhabited sandy desert.

Of the rival claims of the railway and canal, I can only say that the latter doubtless possesses all the advantages, for it has all the facilities for conveying goods and merchandise from sea to sea without transshipment or delay, but in the absence of a canal I maintain that the railway would still be useful for the conveyance of troops, passengers, and above all, Her Majesty's mails, which have been so carried for many years across the overland route.

The climate of the peninsula is much the same as that of India generally, and is divided into the hot, rainy, and cold seasons. The latter continues during the prevalence of the N.E. monsoon, from

November to February, when the temperature ranges from 60° to 80° . The rainy season occurs during the prevalence of S.W. monsoon, between May and September.

Let us now suppose the canal or railway "*un fait accompli*" and we have the following results. The transit of the mails to Bombay and Madras would occupy 19 days; from Madras to the Pakchan river and out of the Pakchan canal, say, 1,150 miles, into the Gulf of Siam, 5 days; from Champong bay to Hong Kong, say, 1,315 miles, $5\frac{1}{2}$ days; $29\frac{1}{2}$ days in all, or a saving of $6\frac{1}{2}$ days on the present route between England and China. The estimate is based on a speed of $10\frac{1}{2}$ knots, but if a 12-knot speed is maintained between Madras and Hong Kong the distance ought to be accomplished in about $8\frac{1}{2}$ days. It may be urged that the saving of a week is very small in proportion to the cost of a canal or railway; but for Imperial purposes I would respectfully observe that a week gained is a boon worth having. For instance, on the voyage from England to Natal when the colonists were in terror of their lives from the Zulu invasion, a week would have been a gain indeed, and the difference of 7 short days in effecting the relief of the garrison now at Candahar is likely to save England's prestige in Afghanistan, and prevent the loss of much bloodshed and treasure to boot.

I need not here dilate on the immense commercial advantages that would result to Madras as a city by the exportation direct of raw cotton to China, as well as twist, which could now be also exported from our spinning mills by the new route, but I will only appeal to the press, to the local Chamber of Commerce, and to the Government, to discuss the subject and to work out the project, which I have here roughly sketched and endeavoured to bring prominently before the public. The question to be solved is, "Can or cannot Madras be made the highway to China?" Steam navigation has within the last 30 years been the means of bringing about a vast increase of personal communication between different countries and nations whom seas divide, but the successful opening of the Suez Canal which came as a surprise upon all civilized nations has indeed tended to completely revolutionize the Eastern trade; while the steam traffic of Madras has, since the

inauguration of the new route, attained considerable proportions. In raising the capital required and carrying out this great project, France certainly did so to her credit alone, and I do not doubt that ere long unless English enterprise takes the lead that she will yet again forestall England and have a canal of her own through this very Malayan peninsula to her possessions in Cambodia and Cochin-China. The difficulties, both political and financial, which exist in connection with the Suez Canal, running as it does through foreign territory, should if possible have no place in any canal through the Malayan peninsula, as its course should run through British territory, or the locality be acquired by purchase or treaty and become a British possession. It is only in this case that England would have the right of excluding vessels belonging to any belligerent nation and particularly those of Russia, to whom the canal would doubtless be highly beneficial for any emergent naval operations on the coasts of China or Japan.

Before concluding these rough notes, it is useful to speculate upon the interest likely to be displayed in regard to the proposed route to China by the trade at Calcutta and Bombay. The latter would doubtless have a good many adverse objections to raise against it, as it would tend to depreciate the regular direct trade with China, while it ought to be hailed with avidity by the mercantile community of Calcutta as a voyage through the Malayan canal from that port to Hong Kong need not occupy more than 10 days, whereas the opium steamers take 15 days to do the run *via* Singapore, at a very high rate of speed. Examining the question therefore from an Imperial point of view and taking into consideration the very large trade between China and Calcutta which is said to be increasing, and particularly the importance of the exportation of opium, we might safely conclude that the Calcutta trade ought to welcome a short and easy route to the Celestials, such as the one now proposed.

Lastly, I need scarcely advert to the great saving of time that would accrue to the China tea clippers, when homeward bound during the N.E. monsoon, as well as to the ordinary sailing vessel traffic from Europe to China during the S.W. monsoon. The tea steamers bound up the Red Sea from China during the prevalence

of the S.W. monsoon, emerge from the China sea through the Straits of Sunda into the Southern Indian Ocean, and after making their westing down in 10° south, steer for Cape Guardafui, whereas with the aid of a canal through the Malayan peninsula, the distance to be run would be shortened considerably.

T. E. MARSHALL,

Deputy Master Attendant, Madras.

THE CONTAGIOUS DISEASES ACTS.

IN the House of Commons on the 13th January last, upon the motion of Mr. Secretary Childers, the Select Committee on the Contagious Diseases Acts was appointed in the following terms:—"To inquire into the Contagious Diseases Acts, 1866, 1869, their administration, operation, and effect." The following are the members of the Committee:—Mr. Massey, Mr. Stansfeld, Mr. Cavendish Bentinck, Colonel Alexander, Viscount Crichton, Mr. Burt, Mr. O'Shaughnessy, Mr. Osborne Morgan, Mr. Cobbold, General Burnaby, Sir Henry Wolff, Mr. Ernest Noel, Colonel Digby, Mr. William Dowler, and Mr. Hopwood. Power to send for persons, papers, and records; five to be the quorum. Ordered, that all reports and returns relating thereto, be referred to the said Committee; that it be an instruction to the Committee, that they have power to receive evidence which may be tendered concerning similar systems in British colonies or in other countries, and to report whether the said Contagious Diseases Acts should be maintained, amended, or repealed.

This Committee is in continuation of one which was appointed by the late Government in 1879, which sat during that and the following year receiving evidence, but making no report. By the time that this is published, it is probable that the present Committee will be again sitting and receiving evidence; also that their report may be expected this Session.

As the subject of the Committee's inquiry is of both interest and importance to the Mercantile Marine, the present is a favourable

time to bring it to the notice of readers of the *Nautical Magazine*, some of whom may be both able and willing to give evidence before the Committee, which evidence would be of great value.

Many captains and officers must have had their attention drawn to the fact that a proportion of their crew are frequently affected with venereal disease, even to the extent of rendering them wholly unfit for duty. It is not unusual for men to be severely afflicted with the more serious form of these diseases (constitutional syphilis), rendering them loathsome objects to their fellow seamen in the fore-castle and deck-house, as well as useless to their officers and shipowners. Now, the full extent of this can never be known, as the men are very well aware that they incur forfeiture of wages by being incapacitated from these diseases, the result of their own misconduct. Still, the evil is a well known one. All our seaports are infested with a low class of prostitutes, and in only a few ports are there any measures adopted to prevent these women from spreading contagious venereal diseases broadcast. The consequences are, as may be expected, that many seamen are infected shortly after arrival from sea, and too often ship again wholly uncured, and unfit to proceed to sea. Others, again, contract disease on the point of departure, and it is frequently much aggravated within a short period from want of medical attendance, and facilities for cleanliness; while a third class, who may have escaped so far, proceed to sea, and soon find to their disgust, that they are suffering from this foul disease, the result of their last debauch ashore. All this mischief is intensified by other circumstances; the paucity of lock hospitals, or lock wards in general hospitals, the inutility of ordinary police regulations to prevent solicitation in the streets by these women; and a general very pardonable dislike to have anything to do with so unsavoury a subject.

Captains and others who may read this and be able to testify to the truth of the foregoing remarks, should, through the officers of the Board of Trade, communicate their wishes to give evidence on this important subject to the Chairman of the Committee at the House of Commons. The Mercantile Marine comprises a number of seamen exceeding enormously the number of naval seamen

and marines. Many are practically in the employ of the Government, those, for instance, on board vessels in the emigration and postal service. Surely their health is the care of the State no less than that of soldiers or sailors.

Now the Contagious Diseases Acts are in force at the following seaports:—Dover, Gravesend, Plymouth and Devonport, Portsmouth, Southampton, Cork and Queenstown. In all these places legislative measures have been adopted to prevent these diseases, so far as is possible, from being propagated by those who are most active in doing this, viz., common prostitutes. These women are, in the localities named above, obliged, so long as they continue their calling, to submit to a periodical medical examination, and, if found diseased, they are compelled to enter hospital, being detained there till cured. Every care is taken to reclaim such women as wish to leave their abandoned life, and to restore them to their own homes; to place them in institutions for their reception, or in respectable situations. Abundant evidence has already been given to this and previous Committees as to the great benefits produced by the Acts, not only in the seaports above named, but in all the places where they are in force.

Now, on the other hand, these Acts are not in force in Liverpool, Hull, Bristol, Dublin, Kingstown, Belfast, Glasgow, Greenwich, Leith, and many other ports; consequently, the common prostitutes who are to be found in large numbers in all these ports are free to disseminate disease to any extent with the results we have already seen. It will probably appear on inquiry that there is a vast difference between the condition of ships' crews leaving ports protected, and ports unprotected by these Acts. Perhaps evidence may be forthcoming on this point. Every effort should be made to ensure the continuance of these Acts in those seaports where, as can be proved, they have effected so much good, and their extension to those ports where they are so much required.

F. W. L.

NOTES FROM CONSULAR REPORTS.

St. Jago de Cuba.—The exports from this port consist of tobacco, sugar, coffee, rum, and cocoa. In 1879, Spain received by far the largest proportion of the two latter commodities, while the two first appear to have been sent in large quantities to Bremen and the United States, a small amount only being shipped to Great Britain. The imports were inconsiderable, chiefly cattle and provisions.

Of shipping visiting the port, it appears that out of 392 vessels, 76 were British. A line of American steamers running direct between the port and New York was established in 1879, and another steam line, under the Spanish flag, from Liverpool. The first cargo of coals in a steam bottom was sent in 1879. Freight was low, owing to the competition between the two lines. No vessel drawing more than 14 feet can load at the public wharf.

The cultivation of tobacco and cocoa has increased, while that of sugar and coffee has declined. It is thought that tobacco cultivation, cattle raising, and cocoa planting, will in future be the principal industries of the district.

CONSTANTINOPLE.

The Consul states that the trade of Constantinople is year by year getting into a more hopeless condition, and it may now be said that the commerce of this great emporium is rapidly dying out. Many causes contribute to this end. Steam communication enables the outports to transact their business direct with foreign markets, so that Constantinople becomes less and less of an entrepôt. The territorial losses, bad harvests, and the corruption of Turkish officials, have all tended to bring commerce to a state of stagnation.

The exports are grain, mohair, wool, cotton, sesame, opium, and tobacco. The grain crops of 1879 were very poor, and in some parts were greatly damaged by locusts. The total clip of mohair for 1879 amounted to 52,000 bags of $1\frac{1}{2}$ cwt. each, but for 1880 and 1881 the Consul estimates a much smaller return. The yield of wool, cotton and sesame was also poor, but opium and tobacco were average crops.

The import trade has suffered from the war of 1878. In 1879, cotton manufactured goods maintained an average business, but coals, iron, and agricultural implements, all showed a marked decline, compared with the imports of such commodities in previous years.

As regards shipping visiting the port, Great Britain takes the lead both in respect to the number and total tonnage. In 1878, 44.78 per cent. of a total of 6,809,243 tons passing through the port was British, and in 1879, out of a total of 6,054,508 tons, 43.16 per cent. was British.

Several projects for the improvement of the Custom-house accommodation at Galata and Stamboul, and also for the construction of quays and bonded warehouses on either side of the Golden Horn have been brought forward, but owing to much exasperating delay on the part of the Government, the parties abandoned their projects, and things appear likely to remain as they are.

The Consul alludes to the probability that the country of Turkey teems with undeveloped mineral wealth, and remarks that "It may be a bold prediction to make that this country will become at no distant period noted for its gold mines, but as it was well known in ancient times as an auriferous region, there is some basis for belief in the possibility of its ancient reputation being revived in this respect." The belief appears to be based chiefly upon the Consul's inspection of a mine about to be worked by Messrs. Calvert, the ore from which appears on assay to be remarkably rich in gold and silver.

The coalfields of Heraclea, belonging to the State, have been for some time worked by natives, who had but a slight knowledge of the precautions necessary in working mines, and in consequence, most of the pits and galleries have fallen in, or are flooded. The working of the mines is now at a standstill, involving the Turkish and Croat colliers in utter misery, the Government owing them long arrears of wages. A company of capitalists and engineers are seeking to turn the coalfields to account, by repairing the damage done, and renewing the plant, but the undertaking must necessarily be one of great expense.

PHILADELPHIA.

The year 1879 showed an unexampled increase in the maritime trade of this port—indeed the records of the last ten years exhibit a rapid and unbroken development of commerce. The exports are numerous, the most prominent being grain, cotton, petroleum, bacon and hams, preserved meats, tallow, lard, tobacco, oil-cake, molasses, fresh and salt beef, &c. To our own country the largest proportion of these commodities was sent, amounting in value to \$19,016,028, the total value of exports in 1879 from Philadelphia being \$50,685,838. The imports for the same period reached in value \$27,244,549, of which England contributed the worth of \$13,964,080, the most important goods sent from our country being iron—pig, bar and scrap, and manufactured; tin plates, cotton, wool and flax manufactures, opium, chemicals, soda, &c.

A noteworthy feature of the shipping returns is, that as regards exports, a small proportion only was carried in American bottoms. Out of a total value of \$50,685,838 the worth of no less than \$42,855,203 was carried in foreign ships. The import returns show a somewhat better condition of things; but out of the total value of \$27,244,549 as much as the worth of \$11,724,485 was brought by foreign vessels. Of these foreign vessels no doubt a very large proportion were British, but the returns do not show this. Shipbuilding does not appear to proceed at a rapid rate, only twenty-four steamers having been built in the United States in 1879. There is a stream of immigration flowing through Philadelphia to the far west, and in 1879 the immigrants passing through numbered 12,883. The United States Government encourage this immigration as much as possible, the value to the country of each immigrant being estimated at \$1,300.

In Philadelphia and its immediate business circle, there are nearly 1000 mills for textile fabrics, employing more than 100,000 persons at wages, and producing \$150,000 worth of woollen, worsted, cotton and silk manufactures in a year. All forms of carpet manufacture are carried on. It appears, however, that there is only a local market at present for these productions.

Philadelphia has made a large increase in her shipments of petroleum, and now stands as the second port of shipment on the

Atlantic seaboard. Pipe lines for transportation of the oil to the seaboard are in working order, and there is little cause given for complaint as to delay in transportation.

In 1879, the coal market was at times particularly active, and also the iron and steel market, by which shipping business at Philadelphia was much stimulated.

VENEZUELA.

Ciudad Bolivar.—There appears to be but little British trade to this port. Gold mining is the chief, and, it may be said, almost the only industry of the State; it absorbs nearly all the labour, and by offering superior inducements, it renders every other enterprise entirely hopeless. Nevertheless, it is a fact that only one, the Callao company, returned dividends to its shareholders, and their mine being one of extraordinary richness, the dividends are very large.

There appears to be some difficulty in navigating the Orinoco up to the port. There are three channels available, but the entrance to the bar requires careful navigation, as the land is very low and similar all along the coast, and it is only by constant sounding that the right course can be ascertained, as both to windward and leeward hard bottom is found, and at the entrance or bar, soft mud. The Vice-Consul says that after all danger is past, the pilot comes on board. During the rainy season, the voyage up can be accomplished without peril, although there may be delay caused by contrary winds and strong currents.

JAPAN.

Hio-go.—The returns for 1879 show an increase on the total value of imports of \$1,665,057 over that of the previous year, the increase being distributed over all classes of merchandize. The imports are mainly cotton and woollen manufactures, metals, kerosine, &c. Exports, on the other hand, show a falling off to the extent of \$889,044, but this is said to be attributable to the cessation of the export of rice. From America there has arisen an active demand for tea, the supply of which stimulated trade, but as regards the other exports, silk, copper, wax, camphor,

porcelain, &c., no great difference is observable. The trade for the year, both export and import, has been on the whole a healthy one, and remunerative to all concerned.

In consequence of the absence of the export of rice, the number of foreign vessels visiting this port has decreased considerably. Sailing ships in particular have found little encouragement.

Eleven small vessels were sold to the Japanese during the year. Three sailing vessels of 138, 214, and 446 tons respectively, one steamer of 127 tons, two steam launches of 8 and 11 tons, have been completed during the year at the Imperial Government Ship-building Yard, and at the Kobe Iron Works seven steamers, suitable for the inland traffic, have been built, and boilers and engines for four more.

Osaka.—The foreign trade of Osaka is increasing, but European merchants are little interested in it, as the imports consist mostly of sugar, drugs, and other eastern produce, and the exports are mostly for the Chinese market. The entire trade is in the hands of native merchants.

Kanagawa.—In the imports sent to this port in 1879, Great Britain's share is no less than 57 per cent. on a total value of \$23,326,000. Yarns, shirtings, Turkey reds, woollen cloths, mousselines de laine, Italian cloth, metals, tin plates, kerosine, &c., appear to be the chief articles of import. The principal exports are silk, tea, and rice, the greater part of which was sent to United States ports. The consul reports that the trade of 1879 has on the whole been fairly remunerative both to foreign merchants and to native dealers.

Japanese shipping displayed great activity during the year. The entries from foreign ports (China) were 53 vessels of 84,817 tons, and from Japanese ports 885 vessels of 492,912 tons; the latter being an increase of 47 vessels and 37,461 tons as compared with 1878. All these vessels were steamers mostly belonging to the Mitsu Bishi or Mail Steamship Company, which now provides the only regular steam communication between Yokohama and the other ports of Japan and Shanghai. A fortnightly line of steamers between this port and Hong Kong is a valuable addition to the existing communication between that colony and Japan.

Nagasaki.—In imports to this port there is a clear increase over the amount in former years, resulting principally from the demand for grey shirtings to export to Corea. The import of metals, sugar and kerosine shows an increase, while that of raw cotton shows a falling off. The total value of exports is less than it has been since 1876, but it still exceeds that of the imports. Tea, tobacco, camphor, dried fish and coal are the chief articles dealt in.

There is a slight decline in the number of British and foreign vessels visiting the port, but there is a large increase of vessels under the Japanese flag. This is due partly to the increasing trade with the Corea. The new dry dock, which was opened in May, 1879, is reported to be a fine piece of work, and in frequent use of late by both Japanese and foreign vessels. The new light-house on Goto Island is of great benefit to vessels trading between Nagasaki and Chinese ports.

Port of Kudinotsu, is situated at the southern extremity of the peninsula of Shimabara, and is the place of shipment for the coal produced at the Muke mines, on the Shimabara Gulf. The output of coal at these mines during 1879 was 116,991 tons, or an average of 390 tons per day for 300 days.

The resources of the district include also agricultural and fishery produce, concerning which no definite returns are given, the market being probably local.

Hakodate.—The Consul reports that ever since the development of this island has been taken in hand by the Colonisation Department, the port of Hakodate has increased in importance, and the trade has been greatly extended. This probably is intended to apply to local trade and importance, for from the returns made in respect to maritime trade, it does not appear that any improvement is taking place. The report says that "each successive year the imports decrease," that "the exports do not differ very much from year to year," and that "both shipping and tonnage are on the decrease." These certainly are not encouraging statements. The tendency evidently appears to be, to let the trade pass through Japanese channels, and to exclude the foreigner. The Mitsu Bishi Steamship Company have expressed their intention of calling at this port *en route* for Shanghai.

JAPAN.—GENERAL.

Foreign Trade for 1879.—A special report on this subject summarises the details given in the foregoing notes, and it appears that the foreign trade of Japan, for the year 1879, shows an increase equal in value to \$383,003 over the trade of 1878. By far the largest proportion of commerce is attached to the port of Kanagawa. Cotton yarn, and raw cotton as imports, show a marked decrease, but in shirtings, mousselins de laine there is a general corresponding increase. The exports of raw silk, and tea, show a very large increase over previous years, while rice shows a very marked decrease. It appears that Japanese rice cannot find any certain market, however abundant may be the crop. The cultivation of wheat is being much extended, and will probably figure as an important item of export from Japan in future returns. The shipping returns show that 708 foreign vessels, with a total tonnage of 641,880 visited Japanese ports in 1879, against 838 vessels of 748,872 tons in 1878. The falling off is chiefly in British and American vessels. As before intimated, this appears to be partly due to the desire of the Japanese to carry on their commerce in vessels of their own. Otherwise, there is a fair promise of increasing prosperity for the country.

CORRESPONDENCE.

LETTING GO ANCHOR WHEN UNDER WAY.

To the Editor of the "Nautical Magazine."

SIR,—One of the greatest of our civil engineers recently called my attention to the following remark of the learned Wreck Commissioner: "The letting go of the anchor was utterly unjustifiable under the circumstances, seeing that the vessel was going over the ground at a rate of $3\frac{1}{2}$ knots an hour," and asked me if I concurred in the opinion. At a time when the status of Nautical Assessors is occupying the attention of men of every denomination from the Naval officer to the members of chambers of commerce, it is neces-

sary to closely study practically and theoretically every sentence which is pronounced by a mercantile Court of Inquiry on the officers of the English marine. Not only is this due to the service itself, but to the fact that foreign nations are at this moment closely studying our jurisprudence with the view of assimilating their practice to that of the courts of this kingdom, no mean compliment to their efficiency.

Now it would be interesting to seamen to ascertain if the above quotation emanated from the learned Commissioner, or is it but the reflection of the opinions of his nautical advisers. This is a point which seriously affects the latter, for all seamen whose experience has placed them in positions where their only chance of safety rested on anchoring, will not readily concur with the judgment. In my young days I have dredged up the rapid and dangerous Hooghly to Calcutta, have dropped up the crowded Mersey, and rounded-to under canvas midst the freshets of the Tagus without losing a single anchor, parting a cable, or in any wise injuring the hull. It is true that on the Hooghly I have seen cutwaters and facing pieces sawn in to the main stem when any unusual strain demanded extraordinary risks, but never with a direct strain have I known a windlass upset or a pall bitt wrenched off, notwithstanding the sudden strain brought on them by the chain as the ship swung to her anchor. That such accidents have occurred with improper fittings it is useless to attempt to deny, but anyone who studies the subject closely, will at once perceive that letting go running, although highly objectionable, positively eases the ship in a double way, first by the cable growing aft, and in some manner counteracting the forward pull due to that part between the bitts and the bows, and secondly to the fact that in ordinary anchorage ground the trend of the cable makes it nip at an extreme angle over the hawse pipe, weakening it, the cable, to such an extent as to ensure parting long before the proof strain was reached. A simple formula easily gives the approximate amount of this reduction of strength. It is as twice the nat. cos. of $\frac{1}{2}$ the $\angle$ is to 1. Thus at 30 the reduction is as .866 to 1, at 45 as .707 to 1, and at 60 it is only one-half. Now the riding fittings of all ships are or ought to be made sufficiently strong to ride with three full-sized chains

a-head until their breaking strain is exceeded, and yet it is authoritatively pronounced that a ship with $3\frac{1}{2}$ knots way on runs a risk of pulling her bows out by the strain of a single chain. Can anyone prove that sudden anchoring in a rapid tidal river brings a different strain on the hull or gear to what a similar amount of headway by sail power would do, or can they prove the converse. I acknowledge that I am unequal to the attempt. In a time like the present, when seamanship is alleged (so far as handling a ship under canvas is concerned) to be on the wane, it would be judicious to avoid weakening the belief of officers in the forces at their command, and I do think that an anchor may often save a ship from drifting into mischief when nothing else can. I may, with all propriety, assure the learned Commissioner and his talented advisers that in working out of the Tagus with a five-knot current, I have often seen ships miss stays, bring up without accident, weigh, and cast again. On Christmas Eve, 1853, the whole fleet, owing to the great rate of the tide, were thus circumstanced, and ultimately the Admiral gave up the attempt until the weather was more favourable.

I must apologise for trespassing on your valuable space, and am,

A NAVAL OFFICER.

COAL AND COKE SHIPMENTS.

To the Editor of the "Nautical Magazine."

SIR,—For the information of your readers, I herewith give you the shipments of coal and coke at the chief coal ports in the United Kingdom for the past year. Compared with 1879, you will notice the Tyne takes the first place, Cardiff second, Sunderland third, Newport fourth, Swansea fifth, the Hartlepoons sixth, and Liverpool seventh, as to the weight shipped.

R. THUBRON,

Ed. "Dock and Port Charges of the United Kingdom."

Newcastle-upon-Tyne, 26th January, 1881.

COAL AND COKE SHIPMENTS, 1879 AND 1880.

	1880.	1879.	Increase.	Decrease
	Tons.	Tons.	Tons.	Tons.
Alloa	145,819 ...	175,091 ...	— ...	29,272
Amble (Warkworth)	178,631 ...	167,873 ...	10,653 ...	—
Ardrrossan	227,713 ...	287,610 ...	— ...	59,897
Ayr.....	312,885 ...	362,514 ...	— ...	49,629
Blyth.....	232,417 ...	234,151 ...	— ...	1,734
Borrowstoness	53,808 ...	63,891 ...	— ...	9,583
Cardiff	5,905,111 ...	5,098,684 ...	806,447 ...	—
Charlestown	201,457 ...	195,910 ...	5,547 ...	—
Dundee	62,882 ...	69,916 ...	— ...	7,033
Glasgow	239,472 ...	247,466 ...	— ...	7,994
Goole	385,780 ...	342,648 ...	43,132 ...	—
Grangemouth	115,750 ...	119,310 ...	— ...	3,560
Granton.....	139,130 ...	186,526 ..	— ...	47,396
Greenock	111,123 ...	119,860 ...	— ...	8,237
Grimsby	875,040 ..	295,415 ...	79,625 ...	—
Hartlepool	1,129,881 ...	1,149,488 ...	— ...	19,607
Hull	617,477 ...	464,370 ...	153,107 ...	—
Inverkeithing	4,804 ...	3,870 ...	934 ...	—
Irvine	97,117 ...	106,976 ...	— ...	9,859
Llanelli.....	196,739 ...	187,510 ...	10,229 ...	—
Liverpool	876,816 ...	1,035,309 ...	— ...	158,493
Newport	1,908,151 ...	1,927,121 ...	— ...	18,970
Port Glasgow	8,349 ...	10,649 ...	— ...	2,300
Seaham	593,274 ...	594,183 ...	— ...	909
St. David's	67,186 ...	55,779 ...	11,407 ...	—
Sunderland	3,356,305 ...	3,129,454 ...	226,851 ...	—
Swansea	1,616,524 ...	1,230,463 ...	386,061 ...	—
Tees Ports.....	109,013 ...	106,556 ...	2,457 ...	—
Troon	332,199 ...	395,637 ...	— ...	63,438
Tyne Ports	8,131,419 ...	7,424,065 ...	707,354 ...	—
Whitehaven	198,838 ...	217,854 ...	— ...	19,016

INQUIRIES INTO WRECKS.

To the Editor of the "Nautical Magazine."

SIR,—There is one thing I should very much like to be informed about, and that is—what is the nature of the assistance which the Assessors who sit at official Wreck Inquiries are supposed to give

to the Court, and do they constitute part of the Court? Perhaps you can inform me and many others who are interested in this matter, because a belief is prevalent that Assessors sometimes sign reports containing statements to which they would not have assented had they been consulted in the framing of the report. The belief is probably erroneous, and ought not to be allowed to gain ground.

I am, &c.,

MASTER MARINER.

[The questions of our correspondent are difficult to answer with definiteness. The duties of the Assessors are clearly to advise the Court on technical matters, and to suggest any special points which may be brought out with advantage to the objects of the inquiry. As regards the Assessors forming part of the Court, there cannot be a shadow of doubt of it; indeed, the point is so clear we are surprised at any one questioning it. The Annex is as much a part of the report of the Court as any other part of that document, and each Assessor who signs it is undoubtedly responsible for every accuracy or inaccuracy it contains. The prevalent belief to which our correspondent refers is one which we cannot share, nor should we think it is so widespread as to require authoritative contradiction. Certainly, if such a state of things were known to exist, it would be, to use the words of a high authority, "one of the greatest blows aimed at the efficiency of these Courts."—Ed. N. M.]

MADEIROS ROCK.

To the Editor of the "Nautical Magazine."

SIR,—On the 5th December, 1880, 4 p.m., the vessel under my command, the *Salus*, of Shoreham, on a voyage from Santos to this port, passed about thirty yards to windward of a rock, which I supposed to be the reported Madeiros Rock. It appeared about fifty yards in extent, in an E.N.E. and W.S.W. direction, and about six or eight feet of water on it, the bottom perfectly distinguishable, of a light grey colour; it appeared in the form of the letter S elongated, and ten to fifteen yards across in the centre.

When we first saw it, it was close on the lee-bow, too late to keep away; we lost sight of it right astern one-third of a mile, wind N.E. by E., gentle breeze, water smooth, no soundings, with 110 fathoms of line 300 yards from it. I should have got a boat out and examined it more fully, but we were short-handed through the sickness of my crew. Our latitude at the time was $25^{\circ} 26'$ S., long. $44^{\circ} 21'$ W. We had tacked off shore from the Alcatrazes Islets the evening previous, wind varying between E. by N. and N.E., moderate weather, allowed three-quarters of a mile per hour to the S.W. for current, observations and dead reckoning agreeing at noon.

JAMES G. TOMS.

New York, January 27, 1881.

SEAMEN'S CONTRACTS.

To the Editor of the "Nautical Magazine."

SIR,—If the master of any vessel ships a crew for a period of twelve months (not for any particular voyage, but liable to be sent to any port in the world), time being the principal object of the agreement, at a certain rate of wages, and with a certain scale of rations, is it legal and right for the owners and master to reduce the rate of wages, the scale of rations, withholding sugar for limejuice, before the expiration of the time agreed for, by simply giving three months' notice of their intention, nothing having occurred, subsequently to the agreement, in any way altering the circumstances under which it was made, or to prevent the vessel prosecuting the work for which the crew were employed, the vessel, in fact, continuing to do the work under the same circumstances as when the agreement was made?

2. If the crew are dissatisfied with the facts above mentioned, can the owners compel them to finish the time agreed for, if they do not wish to remain when the alteration takes place, or prevent them leaving at once when notified of the intended change?

3. Can seamen, engaged under agreement as mentioned in paragraph 1, leave a vessel by simply giving three months' notice?

By answering the preceding in the *Nautical Magazine*, you will give much satisfaction to seamen at a distance from head-quarters.

Yours respectfully,

A SEAMAN.

Nassau, N. P., 23rd December, 1880.

[In any cases of breach of contract, the seamen have their full remedy in a court of law; and the cases referred to by our correspondent, while they would give the seaman the right to appeal to any constituted authority for adjudication and redress, would not entitle him on his part to refuse duty if the ship were at sea, or at a place where he could be legally discharged.—
ED. N. M.]

BOOKS RECEIVED.

Cries in a Crisis. Free Trade in our Manufactures, Shammed by Treaties, Shackled with Duties, and Shattered by Bounties: Foreign Aims upon our Industries and Shipping. The Empire and Emigration. By R. A. Macfie. London: Stanford, 55, Charing Cross. 1881.

THIS work has apparently been compiled for the purpose of demonstrating the injury which England has inflicted upon herself by abandoning her right to levy import duties on certain French manufactures. We say apparently, as the author has arranged his materials—or rather heaped them together—in such a manner as to enable the reader only to form a guess at the meaning intended to be conveyed. Even the drift of single sentences is sometimes left in obscurity. In his preface, for example, Mr. Macfie declares himself a sceptic as regards Free Trade: he then proceeds to congratulate France and the United States upon the success they have achieved under the protective system. These are his words:—"We congratulate these neighbours and kinsfolk on their prosperity, attained under a commercial régime that differs from that which is commonly here regarded as hurtful." The

writer's meaning is probably the reverse of that which his words imply—as the commercial régimes of France and the United States *are* commonly regarded in this country as hurtful. Yet, as though determined to leave us in doubt, Mr. Macfie, in urging the advisability of adopting a moderate system of protection in England, tells us that he has nothing to say in behalf of the system in force in France and the United States. And this in spite of his congratulations upon its alleged results !

Mr. Macfie lays down at least one proposition with which we thoroughly agree, viz., that in a matter of national policy, individual and class interests must yield to those of the community at large. Yet with this axiom for his text, he proceeds to argue that it is the duty of the State to protect British sugar manufactures by levying a duty on French sugar, and thus raising the price of that commodity for every man, woman, and child in the country. Mr. Macfie alleges that the question of Free Trade in manufactures has never been argued, and he endeavours to supply the deficiency by maintaining that British commerce, which thrives mainly through the export trade, can be encouraged by shutting out all foreign competition ; thus bringing about a rise in prices in any quarter where such competition happens to be felt, and turning capital into artificial channels.

It would be useless to follow Mr. Macfie in all his wanderings. The general drift of his discourse resolves itself into a protest against the abolition of import duties, which he thinks might have been utilised as levers, for the purpose of bringing about a true system of reciprocity. He fails to see, that if two nations were to enter on a policy of retaliation, they would probably continue it—as the Kilkenny cats continued their fight—until there remained nothing unprotected on either side. Each might exclude every article of produce of the other, but neither would gain any ultimate advantage by so doing. He pleads for *moderate* duties only ; but in questions of this kind, the term moderate might bear twenty meanings. At all events, it would be regarded in very different lights by consumers and producers.

In favouring us with his views on colonisation, Mr. Macfie proposes a scheme for embodying the entire British Empire in one

grand confederation. "Include the colonies, let them contribute to the area from which are drawn revenues, soldiers, and seamen for the Navy, and how different becomes our position!" To less enthusiastic mortals than Mr. Macfie, it may occur, that the colonists of New Zealand or Canada would possibly object to contribute to the expense of Afghan or Abyssinian wars. He, however, is convinced that they would hail such a scheme with delight. The affairs of this great union are to be harmoniously controlled by a council of representatives from all parts of the Empire; but, examined by the light of recent Parliamentary events, this proposal to reconcile the widely differing interests of Great Britain, India, Canada, Australia, and a few other portions of the earth's surface, will appear somewhat chimerical.

In addition to the schemes and suggestions above referred to, Mr. Macfie has a proposal for mending the Parliamentary constitution, by reforming the House of Lords. But here we need not follow him. Neither shall we attempt to analyse the appendix, of which a considerable portion of his work is composed. On the whole, we may say, that a more ill-digested conglomeration of statements and quotations it has seldom been our lot to peruse. The author himself expresses a wish that his self-imposed task had been better discharged, and in this wish, for the sake of his readers, we heartily concur. We should strongly advise him to reduce his ideas to something like order, before he again attempts to make them public.

The Royal Navy, 1872-80, in a Series of Illustrations from Original Drawings. By W. F. Mitchell. With an introduction by a Naval Architect. Portsmouth: Griffin & Co., 2, The Hard. London Agents: Simpkin, Marshall & Co. 1881.

WE have no hesitation in saying that the work now before us is as useful as it is handsome. The introduction by a naval architect is marked by clearness, precision, and completeness. He briefly describes the several types of war ships which from time to time have been designed and constructed, and gives a general and interesting summary of what has been done since 1872.

Among other matter treated of is the relative strengths of the

Navies of France, Germany, Italy and Great Britain, and the comparison is one which certainly must be agreeable to our national vanity. Details are also given of the Consular service and its requirements, as well as of the fast merchant ships suitable for independent service in war, and there is also a brief account of the development of torpedo warfare.

The letterpress portion of the work occupies about eleven pages, the remainder being taken up with illustrations; we must say that Mr. Mitchell has managed to give to the ugliest of our ironclad darlings such attractive surroundings that one almost is inclined to think them quite picturesque. The volume contains no less than 25 coloured lithographs, the drawing and *tout ensemble* of each being quite a work of art. The present set of lithographs is in continuation of a set brought out in 1872, which represented vessels produced at various times between 1765 and 1872. The *Inflexible*, *Shannon*, *Temeraire*, *Dreadnought*, *Alexandra*, *Neptune* (formerly *Independencia*), *Shah*, *Raleigh*, *Challenger*, *Orontes*, *Himalaya*, are some of those depicted in the present volume, besides sundry types of unarmoured ships, gunboats, &c. There is also a pretty drawing of a torpedo boat, and a suggestive picture of three old line of battle ships, one, the *Excellent*, now employed as a school for gunnery. Certainly the pictures presented in the book are admirably lithographed, and those who are interested in the ships of our Royal Navy, or who find a delight in looking at pretty sea pieces, will do well to obtain the work itself. It is admirably got up and well printed, and the details on the page following each picture are really of much value for purposes of reference.

Abridgement of the Nautical Almanac for 1881. Philadelphia: Riggs & Brother.

It is a common practice for most of our principal opticians and nautical instrument makers to publish, year by year, small almanacs of such astronomical data as are most useful for sea purposes. A similar custom prevails in the United States, and none that we have seen is better than Messrs. Riggs' Almanac; it is at once concise, clear, and sufficient for the purpose. But this

year's Almanac is particularly valuable, inasmuch as it contains an original article on "Maritime Meteorology and the Law of Storms," by Professor B. Maury, formerly assistant to General Myer in the Signal Office at Washington. The article is not long, but the subject is discussed with great judgment, and presented in a form intelligible to the most unscientific seaman. The hints for handling ships in or near a cyclone are especially worthy of attention and study.

Der "Prinz Adalbert"—Teifun vom 10 bis 16 September 1879, nebst meteorologischen Beobachtungen während desselben. Mit Anhang der "Toyoshima Maru"—Teifun am 1 und 2 September 1879: mit 4 Tafeln: von E. Knipping, Tokio, Japan. Berlin, 1880.

THE pamphlet before us describes, and amply illustrates, two typhoons that occurred on the western side of the North Pacific, in September, 1879. One, that of the 1st and 2nd of September, and here designated the "Toyoshima Maru" typhoon, was traced in its N.N.E. course through 200 miles, in the vicinity of the Bonin islands; its further history is unknown. But the great feature of this record is, the "Prinz Adalbert" typhoon, which was tracked from northward of the Bonin islands, on the 10th of September, along the east side of Nipon, across the N.E. end of Yezo, eastward of Saghalin, where it appears to have recurred, on 16th September, towards the N. Eastward, passing southward of Cape Lopatka, the extreme southern point of Kamtchatka. Its history, throughout its course, was derived from the logs of twenty-eight vessels, and the records of sixteen lighthouses and observatories along the coast of Japan. On a former occasion, we had to speak of the industry of Mr. E. Knipping, in collecting information respecting Japanese typhoons, but this is certainly the most complete investigation of the storms on the Japanese side of the Pacific that we as yet possess. The spiral direction of the winds in the typhoon, the isobars for each successive day, the rainy side of the storm as it moved onwards, and all its special meteorological features are well laid down on the various diagrams with which the pamphlet abounds. It is to be hoped Mr. Knipping will continue these

investigations as the typhoons occur, until we know as much of the storm-phenomena of the North Pacific, as we do of those of the Mauritius, through the able researches of Mr. Meldrum.

Report of the Meteorological Council to the Royal Society, for the Year ending 31st of March, 1880. Presented to both Houses of Parliament, by Command of Her Majesty. 1881.

Year by year, the Meteorological Office gives us the history of its progress in the various departments of Ocean Meteorology, Weather Telegraphy, and Land Meteorology of the British Isles. We have before us the record for the year ending March, 1880. Our navigators are most concerned with Ocean Meteorology, and the Council have been devoting their attention to the *six 10-degree squares lying near the Cape of Good Hope, to the surface temperature and currents of the Pacific Ocean, to the sea temperature observations round the coasts of the British Isles, and to Arctic Meteorology.* The records of the last subject are now completed; and, in so far as regards the *Meteorology of the Indian Ocean*, it appears that the Council have supplied Mr. Blandford with a copy of all meteorological information for the Indian seas contained in the office logs, and that the Meteorological Department of the Government of India is likely to turn that information to immediate account. Our readers will have noticed that, during the last twelve months, Mr. R. H. Scott contributed some papers to our pages, and that these embraced the subject of *weather telegraphy* and the relative value of storm warnings. These warnings are wonderfully good, considering that parsimony still stands in the way of connecting our own stations with the Azores and Iceland by means of a cable. Captain Toynbee continues to speak well of the contributions to meteorology furnished by the officers of the Mercantile Marine, and there appears to be an increase in the demand for instruments. The appendices, or notes, to the official reports are generally valuable, and, though largely technical, are easy of comprehension to those who have some knowledge of mathematics. We cannot conclude without impressing on our readers that their sea library will be incomplete without "*Aids to the Study and Forecast of Weather,*" by W. Clement

Ley, M.A., the latest official publication of the Meteorological Department.

The Currents of the Air for 1881: being a Weather Forecast with the probable dates of Storms. By D. Dewar. Glasgow: James Brown and Son.

ON the principle that the pages of the *Nautical Magazine* are always open to any one that has something new to tell, Mr. Dewar's forecasts of weather were once contributed to our volume during one year. Some considered the forecasts approximately correct; others pooh-poohed them *in toto: tot homines tot sententia*. Mr. Dewar has now issued in pamphlet form weather-forecasts for the year 1881, and explains the basis on which the predictions rest. The theory is very plausible, but utterly inconsistent with anything natural. Like all forecastings they rest on luni-solar changes, and whether these are considered in their monthly, annual, or secular courses, it is nothing less than absurd to suppose that any "primary" or "secondary tendencies" can produce similar characteristics of weather over a whole hemisphere. Other weather prophets apply their method to "all parts of the earth." It matters not which be taken—a single hemisphere, or the two—scores of cyclonic and anti-cyclonic areas must be daily developed on various parts of the earth's surface, each bringing its own peculiar characteristic wind and weather to a given locality, and thus falsifying any general prediction. But we are sorry to see that the forecasts in this pamphlet go beyond those relating to weather: they extend to "tides, sunspots, auroræ, earth currents, magnetic storms, and seismic disturbances." Now, "these phenomena may be linked together," as are all things natural; but, certainly, not so intimately linked with ordinary meteorological phenomena as the author supposes. A careful study of the daily weather maps would at once convince all weather-prophets that even in so limited an area as the British Islands, one kind of weather in the north may be co-existent with a very different kind in the south. It so happens that the writer of this notice was on the water on the 18th of January and the 6th and 7th of February, periods of two *fierce storms*, but wholly different in their wind-

direction and general atmospheric phenomena; and, certainly, nothing like the forecasts of this pamphlet. We fear that the author is not sufficiently alive to the serious responsibility he takes upon himself in predicting such a terrible disaster as an earthquake. Such a prediction in a so-called weather almanac a few years ago had a most disturbing effect upon the inhabitants of the West Coast of America. The earthquake prognosticated did not occur, but nevertheless the greatest uneasiness and alarm prevailed about the time named in the prediction. Every region which is supposed to be an earthquake district might apply the prediction of "Seismic disturbances" to their own locality, and it is not difficult to understand that serious consequences might ensue from the terror which might thus be generated. The author is, undoubtedly, a man of talent, and we should, therefore, recommend him to turn his energies into another and more useful channel than the forecasting of weather and the predicting of earthquakes..

INDIA.—RIVER HOOGHLY SAND-HEADS.—*Light Regulations for Pilot Brigs.*—The Port Officer, Calcutta, has notified that on and after the 1st day of July, 1881, the pilot brigs at the Hooghly Sand-heads will, when under way and cruising about, show the usual red and green side-lights. When they are hove to, engaged in supplying or taking out a pilot, and thus not under command, the side-lights will be obscured, and the bright mast-head light exhibited according to the Regulations of the Board of Trade. On the near approach of a vessel, a white light will be shown over the brig's stern. 2. While pilot brigs are at anchor, the usual anchor light will be hoisted at the starboard fore yard-arm. 3. The maroons, or flare-up lights, will, as heretofore, be burnt by the brigs every quarter of an hour, whether under way or at anchor, from sunset to sunrise, in accordance with the aforesaid Regulations.

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

ing the Tidal Constant of the place, according to its sign (+ add, the time of high water on the given day at the port of reference, you ne of high water at the place sought.

PL.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
	H. M.			H. M.	
	-1 17	Leith	Jersey (St. Helier) . . .	+2 38	Brest
	-3 52	Liverpool	Kinsale	-0 18	Queenstown
	+2 59	Brest	Lerwick (Shetland) . .	-3 47	Leith
	+5 13	Dover	Limerick	+1 15	Queenstown
	-0 42	Leith	Lisbon bar	-1 17	Brest
	+0 50	Brest	Littlehampton	+0 24	Dover
	-2 25	Kingstown	Llanelli bar	-0 38	Weston-s.-Mare
	-0 18	Greenock	Lowestoft	-4 1	London
	-1 49	Leith	Lynn & Boston Deep . .	-0 29	Hull
	-1 14	Queenstown	Margate	-2 18	London
	-0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
	-0 2	Brest	Milford Haven entr. . .	-0 58	Weston-s.-Mare
	+0 8	Dover	Montrose	-0 52	Leith
	-0 51	Liverpool	Morlaix	+1 6	Brest
	+2 42	Londonderry	Needles point	+1 26	Dover
	-1 5	N. Shields	Newcastle	+2 33	N. Shields
	-0 8	N. Shields	Newhaven	+0 39	Dover
	+3 3	Brest	Newport	+0 16	Weston-s.-Mare
	+0 13	Dover	Nieuport	+1 6	Dover
	+0 22	Devonport	Nore	-1 28	London
	+0 19	Weston-s.-Mare	Orfordness	-2 43	London
	-2 2	Brest	Oporto	-1 17	Brest
	-1 56	Liverpool	Ostende	+1 13	Dover
	+0 37	Dover	Padstow	-1 41	Weston-s.-Mare
	-0 23	Greenock	Peel, Isle of Man . . .	-0 15	Liverpool
	+0 2	Weston-s.-Mare	Pembroke Dock	-2 42	Weston-s.-Mare
	-4 22	Liverpool	Penzance	-1 13	Devonport
	-0 10	Kingstown	Peterhead	-1 43	Leith
	-0 47	London	Piel harbour, Barrow . .	-0 18	Liverpool
	+4 2	Brest	Plymouth breakwater . .	-0 6	Devonport
	-1 37	Londonderry	Poole	-2 2	Dover
	-0 23	N. Shields	Port Carlisle	+0 47	Liverpool
	-0 10	Brest	Portland breakwater . .	+1 18	Devonport
	-0 27	Dover	Port Patrick	-0 58	Greenock
	+4 41	Greenock	Portsmouth	+0 29	Dover
	-2 21	Leith	Ramsgate	-2 19	London
	+0 33	Devonport	Rotterdam	+4 33	Dover
	+0 3	Dover	Santander	-0 17	Brest
	+7 19	Brest	Scarborough	+0 48	N. Shields
	+0 3	Kingstown	Selsea bill	+0 38	Dover
	+0 17	Queenstown	Sheerness	-1 21	London
	-0 11	Liverpool	Shoreham	+0 22	Dover
	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
	-0 16	Kingstown	Southampton	-0 42	Dover
	-0 27	Dover	Spurn point	-1 3	Hull
	+0 56	Dover	St. Ives	-2 10	Weston-s.-Mare
	+0 38	Devonport	St. Malo	+2 18	Brest
	-0 46	Devonport	St. Mary (Scilly) . . .	-1 16	Devonport
	+6 57	Brest	St. Nazaire	-0 7	Brest
	-0 47	Brest	Stornoway	+6 38	Greenock
	-1 59	Hull	Stromness (Orkneys) . .	-5 17	Leith
	-0 12	Liverpool	Sunderland	-0 1	N. Shields
	-0 5	Dover	Swansea bay	-0 53	Weston-s.-Mare
	-0 29	Devonport	Tay bar	-0 11	Leith
	+1 42	Dover	Tees bar	+0 22	N. Shields
	-0 26	Queenstown	Tenby	-1 12	Weston-s.-Mare
	-1 27	Brest	Thurso	-5 49	Leith
	+0 10	Greenock	Torbay	+0 17	Devonport
	+2 51	Weston-s.-Mare	Tralee bay	-0 58	Queenstown
	+2 26	Brest	Ushant (Ouessant) . . .	-0 15	Brest
	-0 48	London	Valentia harbour	-1 19	Queenstown
	-0 53	Hull	Waterford	+0 19	Queenstown
	+3 50	Brest	Westport	-0 4	Queenstown
	+0 5	N. Shields	Wexford	+2 20	Queenstown
	-1 52	London	Whitby	+0 22	N. Shields
	+6 4	Brest	Whitehaven	-0 9	Liverpool
	+0 21	Dover	Wick	-2 55	Leith
	-1 12	Liverpool	Wicklow	-0 41	Kingstown
	-0 53	N. Shields	Workington	-0 19	Liverpool
	+5 42	Brest	Yarmouth road	-4 43	London
	-1 59	Leith	Youghall	+0 13	Queenstown

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	PLACE.	SUBJECT.
79	ENGLISH CHANNEL—Eddystone	New lighthouse, light and fog-signal in 1882.
80	ENGLAND—East Coast—Humber River—Brough	Lights discontinued.
81	SCOTLAND—East Coast—Anstruther	New lights.
82	BALTIC ENTRANCE — Kattegat — Læsø Island—North Rønner	New fog-signal.
83	" " The Sound	Depth of water over wreck.
84	" " " Falsterbo Point	Signals at lighthouse.
85	BALTIC—Bornholm—Odde Point	New fog-signal.
86	" " Hammar Point	New fog-signal.
87	" Prussia—Memel	North Mole-head lighted.
88	" Gulf of Bothnia—Bengtskar	New beacon.
89	FRANCE—West Coast—Donarnenez Bay—Millier Point	Alteration in light.
90	" " Iroise—Chaussée de Sein—Ar-Men Rock	New light at close of year.
91	MEDITERRANEAN—France—Planier	Partial obscuration of light.
92	" Spain—Burriana	Lights altered in position : range
93	" Archipelago—Euripo Channel—Bury Narrows	New light.
94	" Dardanelles	Torpedoes floating about.
95	EASTERN ARCHIPELAGO—Java—Tegal	New harbour light.
96	CHINA—East Coast—Breaker Point	New light.
97	" " Tingtae Bay	Discovery of shoal.
98	" Hai-tan Strait—Passage Islands	Position of sunken rocks.
99	SOUTH AUSTRALIA—Backstairs Passage—Caper Willoughby—Scraper Shoal	Clearing mark for the shoal.
100	SOUTH PACIFIC OCEAN—New Caledonia—Port Moneo	Discovery of coral patch.
101	PACIFIC COAST—United States—Oregon—Columbia River	New channel formed.
102	SOUTH AMERICA—West Coast—Peru—Barranca River	Extension of spit.
103	CANADA—Nova Scotia—Shelburne Harbour—Sand Point Spit	New lighthouse and light.
104	GULF OF ST. LAWRENCE—Cape Breton Island—Little Brass d'Or Lake—St. Patrick Chan.	New light in Little Narrows.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

79.—ENGLISH CHANNEL.—*Eddystone New Lighthouse.*—*Alteration in Character of Light and Fog-Signal.*—The new lighthouse which has been for some time past in course of erection at

Eddystone rocks is now far advanced towards completion, and may be expected to be ready for the exhibition of a light early in the month of March, 1882. The light will be at an elevation of 133 feet above high water, and will be a powerful *white double flashing half-minute light*, showing *two successive flashes* of about *two-and-a-half seconds'* duration, divided by an *eclipse* of about *four seconds*, the *second flash* being followed by an *eclipse* of about *twenty-one seconds*. The light will be visible all round the horizon, at a distance of $17\frac{1}{2}$ miles. A *white fixed* subsidiary light will also be shown from a window in the lighthouse below the flashing light, to mark the Hand Deeps. This will extend over a sector of 16 degrees from N., 32° W. to N., 48° W. A large bell will be sounded during foggy weather twice in quick succession every half-minute; thus assimilating the character of the sound signal to that of the light.

Note.—Mariners will observe that the light on the Casket Rocks, 78 miles S.S.E. from the Eddystone, is similar in character, but shows *three* flashes in quick succession instead of *two*. Further notice will be published in due course.

80.—ENGLAND.—*East Coast.*—*Humber River.*—*Brough Lights Discontinued.*—The two lights at Brough (about 10 miles above Hull), not being required at present to assist vessels in rounding the northern edge of Whitton Ness sand, are discontinued until further notice.

81.—SCOTLAND.—*East Coast.*—*Anstruther.*—*Lights at the Union Harbour.*—The following lights are now exhibited:—(1) A *fixed red* light on the extremity of the east pier; (2) a *white light* in Chalmers' lighthouse, on the extremity of the west breakwater; and (3) two *green* leading lights, one in East Green-street, and the other at the shore end of the east pier, the bearings of which are as follows:—N.E. $\frac{1}{2}$ N. and S. W. $\frac{1}{2}$ S., the said leading lights to be exhibited throughout the year other than the months of May, June, July, and August.

82.—BALTIC ENTRANCE.—*Kattegat.*—*Læsø Island.*—*Fog-Signal at North Rønner.*—The siren at North Rønner ($3\frac{1}{2}$ miles northward of Holmen Point), placed 137 yards northward of the lighthouse, gives, during thick or foggy weather, *three powerful blasts* in quick succession every two minutes.

83.—BALTIC ENTRANCE.—*The Sound.*—*Withdrawal of Wreck-marking Vessel.*—The wreck (*Harlequin*), the exact position of which is $4\frac{1}{2}$ miles S.W. $\frac{1}{4}$ W. from the position of Dragör (Drogden) light-vessel, has been partially blown up, and on 10th January, 1881, the wreck-marking vessel was withdrawn.

Note.—There is 22 feet of water over the wreck, which, as soon as circumstances allow, will be increased to 24 feet. *Variation*, $11\frac{1}{4}^{\circ}$ W.

84.—BALTIC ENTRANCE.—*The Sound.*—*Signals at Falsterbo Point Lighthouse.*—The following signals will be made from a mast (63 feet high) with yard, situated about 180 yards south-westward of Falsterbo point lighthouse, southern approach to Flint and Drogden channels:—A ball on the northern yard-arm, indicates that the light-vessels in Flint channel are withdrawn. A ball on the southern yard-arm, indicates that Dragör (Drogden) light-vessel is withdrawn. A ball on the mast above the yard, indicates that the light-vessels in Flint channel are withdrawn, and that the channel is blocked by ice. A ball on the mast below the yard, indicates that Malmö harbour is blocked by ice.

85.—BALTIC.—Bornholm.—*Fog-Signal at Due Odde Point.*—The *siren* at Due Odde point (south end of Bornholm), placed 103 yards southward of the lighthouse, will give, during thick or foggy weather, *one powerful blast every two minutes*.

86.—BALTIC.—Bornholm.—*Fog-Signal at Hammar Point.*—The *siren* at Hammar point (north end of Bornholm), placed 68 yards north-westward of the lighthouse, will give, during thick or foggy weather, *two powerful blasts in quick succession every two minutes*.

87.—BALTIC.—Prussia.—*Memel.*—*North Mole Head Temporarily Lighted.*—The works of the north mole head at Memel will be continued in favourable weather; and for this purpose the mole head will be lighted by ordinary lanterns.

88.—BALTIC.—*Gulf of Bothnia.*—*Beacon on Bengtskar Rock.*—A new sea-mark has been erected on the Bengtskar rock, within the district of the Jungfrusund pilot station, in the Ekenas pilotage division. The beacon consists of a four-sided wooden structure, 12 feet high, from the middle of which rises a mast with a board at the top, and two spars crossing one another at the mast, each

having a board at the top. The structure is painted white on the South side, and red on the other sides. The masts, spars and boards are painted red. The height of the beacon is 26 feet above the ground, and 58 feet above the level of the sea, and it is visible at a distance of 8 miles. Position, lat. $59^{\circ} 43' 10''$ N., long. $22^{\circ} 30'$ E.

89.—FRANCE.—*West Coast.*—*Donarnenez Bay.*—*Light on Millier Point.*—*Caution*; it is expected that very considerable alterations, particulars of which are not fully to hand, will be made here towards the end of March.

90.—FRANCE.—*West Coast.*—*Iroise.*—*Chaussée de Sein.*—*Light on Ar-Men Rock.*—The lighthouse on this rock may possibly be lighted about August, 1881. It will be a *fixed white* light, elevated 95 feet above high water, and visible from a distance of 20 miles. Position, lat. $48^{\circ} 3' 1''$ N.; long. 5° W.

Note.—If the light is not exhibited before 1st September, 1881, it may not be shown before the spring of 1882.

91.—MEDITERRANEAN.—*France.*—*Planier.*—*Partial Obscuration of Light.*—The present light is partially obscured (by the new lighthouse in course of construction), through an arc of 25° , from northward of Rion island to Mount Rose. The new light will be exhibited during the present year.

92.—MEDITERRANEAN.—*Spain.*—*Burianna Light.*—*Alteration in Position, Arc of Visibility.*—This light is exhibited from a column painted green, rising from the centre of a yellow structure, recently erected between the north-east end of the line of warehouses on the beach at Burriana, and Seco river entrance—44 yards from the shore, and 268 yards north-eastward of the old lighthouse buildings. It is a *fixed red* light, elevated 28 feet above the sea (23 feet above the ground), and visible through an arc of 180° , or between the bearings of N.E. by E. and S.W. by W.; it should be seen from a distance of 9 miles. Variation, $15\frac{1}{2}^{\circ}$ W.

93.—MEDITERRANEAN.—*Archipelago.*—*Euripo Channel.*—*Light on the Western Point of Burj Narrows.*—A light is now exhibited from a lighthouse recently erected on the western point (about 50 yards from its extremity) of Burj (Bourgi) narrows; it is a *fixed red* light, elevated 29 feet above the sea (27 feet above

the ground), and visible from a distance of 9 miles. Position, lat. $38^{\circ} 24' 15''$ N., long. $23^{\circ} 38' 25''$ E.

94.—MEDITERRANEAN.—*The Dardanelles*.—*Torpedoes Floating off Kephez Point and Souan Dereh*.—Two of the torpedoes laid down off Kephez (Barbers) point, on the Asiatic shores of the Dardanelles, and one of those laid down at Souan Dereh, on the European shore, are to be seen floating on the surface of the water, and constitute a danger to passing vessels, especially to those upward bound and navigating inshore to avoid the current. As these torpedoes are strong iron cylinders, contact with them would be attended with risk either of the hull being stove, or the paddles and propellers of steam-vessels being injured. Mariners are cautioned accordingly.

95.—EASTERN ARCHIPELAGO.—*Java*.—*North Coast*.—*Harbour Light at Tegal*.—Exhibited from the Western mole head. It is a *fixed white* light elevated 48 feet above high water, and visible from a distance of 8 miles. Position as given, lat. $6^{\circ} 51' 10''$ S., long. $109^{\circ} 8' 15''$ E.

96.—CHINA.—*East Coast*.—*Occulting Light on Breaker Point*.—Exhibited from a lighthouse erected (close seaward of the boulder) on Breaker point; it is an *occulting* light, alternately showing for *eight seconds* and suddenly disappearing for *two seconds*, elevated 152 feet above the sea, and visible from a distance of 19 miles. It shows *white* seaward between the bearings of $N. 53^{\circ} E.$ and $S. 55^{\circ} W.$, and *red* inshore of those bearings to the land. The lighthouse, 120 feet high, circular in shape, and constructed of iron, is painted black and white in horizontal bands; the dwellings and boundary wall white. Position approximate as given, lat. $22^{\circ} 56' 30''$ N.; long. $116^{\circ} 28' 10''$ E. Variation, 0.

97.—CHINA.—*East Coast*.—*Shoal Ground in Tingate Bay*.—H.M. surveying vessel *Maggie* notifies the existence of shoal ground lying in the south-western part of Tingate bay. This shoal consists of a rocky patch, a quarter of a-mile long in a N. by E. and S. by W. direction, and one-eighth of a mile broad, with 2 fathoms over it; its southern extreme (2 fathoms) lies with the following bearings and distances, viz.:—Nantai Wushau pagoda, $N. 1\frac{1}{2}^{\circ} W.$; south extreme of Table head, $72\frac{1}{2}^{\circ} E.$, distant

2 miles; Notch island summit, S. 41° W., distant $3\frac{1}{10}$ th miles. Variation, $\frac{1}{4}^{\circ}$ W.

98.—CHINA.—*Hai-tan Strait*.—*South-Western Approach*.—*Sunken Rocks South-Eastward of Passage Islands*.—Three sunken rocks lie in and near the northern channel between Passage and Red Yit islands, south-western approach to Hai-tan strait:—

(1.) *Douglas Rock*, on which the steam-vessel *Douglas* struck in 1880, is a pinnacle rock of very small extent (only a few feet), with 4 feet over it at low water spring tides, lying with the following bearings and distances, viz.:—Rock (one foot high), N. 22° E., distant $3\frac{1}{10}$ ths cables; Western summit of West Passage island, N. 48° W., distant $10\frac{1}{10}$ ths cables; Cliff island summit, S. $49\frac{1}{4}^{\circ}$ W.

Note.—The wreck of the steam-vessel *Douglas* bears N. 67° E., distant $1\frac{1}{2}$ cable from the Rock (one foot high).

(2.) The Northern of two pinnacle rocks situated south-eastward of Douglas rock, is of very small extent, with 12 feet over it at low water spring tides, situated with the following bearing and distance, viz.:—Rock (one foot high), N. 10° E., distant $3\frac{3}{10}$ ths cables.

(3.) The Southern rock is also of very small extent, with 6 feet over it at low water spring tides, lying with the Northern pinnacle bearing N. 14° E., distant $1\frac{3}{10}$ ths cable.

Note.—The channel between Passage and Cliff islands cannot be recommended, and should not be used except in cases of emergency—the bearing of White island, given on Admiralty plan No. 818, as leading through, should be erased. Variation, 1° W.

99.—SOUTH AUSTRALIA.—*Backstairs Passage, Cape Willoughby*.—*Clearing Mark for Scraper Shoal*.—The centre of the Telegraph Station (at a distance of 89 yards from the base of the Cape Willoughby lighthouse), kept in line with the lighthouse, leads about 3 cables outside or eastward of the Scraper shoal in 7 fathoms at low water spring tides. The Beacon referred to in Admiralty Sailing Directions, “Australia Directory, vol. 1, 1876,” as being on Cape Willoughby, has been removed.

100.—SOUTH PACIFIC OCEAN.—*New Caledonia*.—*West Coast*.—*Shoal in Port Mouéa*.—A coral patch with $4\frac{1}{2}$ to $11\frac{1}{2}$ feet of water

over it has been discovered, $3\frac{1}{2}$ cables S.E.-ward of the south point of Nepoui peninsula. The patch extends $1\frac{1}{2}$ cable east and west.

101.—PACIFIC COAST.—*United States.—Oregon.—Mouths of the Columbia River.*—A new opening has formed in the sands at the mouth of the Columbia river, directly south of Chinook spit, between Sand island and the Middle sands. Several vessels have come in by this channel, which is now 21 feet in the shallowest part, at low water, and, it is believed, will gradually deepen.

102.—SOUTH AMERICA.—*West Coast.—Peru.—Barranca River Entrance.—Reported Extension of Spit.*—The spit at Barranca river entrance, about 6 miles north-westward of Supé bay, is reported—on the authority of the Manager of the Pacific Steam Navigation Company at Chimbote—to be gradually extending to the westward.

Note.—Vessels navigating this part of the coast should not approach the Barranca river spit within the distance of three miles, especially in thick or hazy weather.

103.—CANADA.—*Nova Scotia.—South-East Coast.—Shelburne Harbour.—Light on Sand Point-Spit.*—Exhibited from a lighthouse erected (to replace Sand point lighthouse, burnt down in 1878) on Sand point spit, east side of Shelburne harbour. It is a *fixed red* light, elevated 47 feet above high water, and visible seaward from a distance of 10 miles. The lighthouse, 44 feet high, is a square wooden tower painted white, standing on a timber pier situated about 80 yards from the extremity of the spit. Position, lat. $43^{\circ} 41' 25''$ N., long. $65^{\circ} 19' 30''$ W.

104.—GULF OF ST. LAWRENCE.—*Cape Breton Island.—Little Bras d'Or Lake.—St. Patrick Channel.—Little Narrows.—Light at Eastern Entrance.*—On the opening of navigation in 1881, a light will be exhibited from a lighthouse erected on the south side of the eastern entrance to Little Narrows, Little Bras d'Or lake:—It will be a *fixed white* light, elevated 40 feet above high water, and visible from a distance of 10 miles. The lighthouse, 35 feet high, is a square wooden structure, painted white. Position, lat. $46^{\circ} 0' 0''$ N., long. $60^{\circ} 58' 25''$ W.

OUR OFFICIAL LOG.

EXAMINATION FOR CERTIFICATES OF COMPETENCY OF MASTERS AND MATES OF FOREIGN-GOING STEAMSHIPS.

PRELIMINARY.

On and after the 1st day of March, 1881, certificates of competency will be issued, subject to the examinations hereinafter described, for officers who have served in steamships, and who, owing to absence of service in square-rigged sailing-ships, cannot, under the existing regulations, obtain certificates of competency to act in the capacity of masters or mates of square-rigged steamships.

These certificates will entitle the holders to go to sea as masters and mates of foreign-going steamships, but will not entitle the holders to go to sea as masters or mates of foreign-going sailing-ships.

The forms of certificates will differ from those at present in use.

There will be no distinction in respect of "fore and aft" and "square-rigged" steamships.

REGULATIONS AS TO EXAMINATIONS.

QUALIFICATIONS FOR CERTIFICATES OF COMPETENCY FOR FOREIGN-GOING STEAMSHIPS ONLY.

Examination in Colours.—All candidates for certificates of competency must pass the examination in colours.

A Second Mate.—Must be seventeen years of age, and must have been four years at sea.

In Navigation.—He must write a legible hand, and will be required to give in writing definitions of various astronomical and other terms used in navigation. He must have a competent knowledge of the first five rules of arithmetic and the use of logarithms. He must be able to work a day's work complete, correcting the courses for deviation, leeway, and variation. He will be required to find the latitude by meridian altitude of the sun, and the difference of longitude from a given departure by parallel sailing ;

also to find the course and distance from one position to another by Mercator's method. He will be required to find the time of high water at a given port, to observe and calculate the amplitude of the sun, and to find the error of the ship's compass therefrom, and also the deviation, the variation being given. He must be able to find the daily rate of the chronometer from error observed, and to find the longitude from altitude of the sun by the usual methods. He must understand the use of the sextant with its adjustments, and be able to observe with it, find the index error by the horizon, and read off and on the arc. He must also pass a satisfactory examination in the International Code of Signals.

In Seamanship.—He must give satisfactory answers as to the standing and running rigging of steamships; as to bending, unbending, setting, reefing, taking in and furling sail; as to sending masts and yards up and down, &c., &c.; as to seeing everything in readiness and clear for getting under way, and as to the precautions to be then observed with regard to engines, propeller, &c.; as to the management of a steamship when under canvas; and as to dunnaging and stowing cargo, &c. He must have a thorough knowledge of the rule of the road as regards both steamers and sailing vessels, their regulation lights, and fog and sound signals, and be able to describe the signals of distress and the signals to be made by ships wanting a pilot, and the liabilities and penalties incurred by the misuse of these signals. He must be able to mark and use the lead and log-lines. He must also understand the construction, use, and action of the sluices, and of the water-ballast tanks, engine-room telegraph, &c.; the use and management of the rocket apparatus in the event of his vessel being stranded, and other questions of a like nature, appertaining to the duties of the second mate of a steamship, which the examiner may think necessary to put to him.

An Only or First Mate.—An only mate must be nineteen years of age, and must have served five years at sea. A first mate must be nineteen years of age, and must have served five years at sea, of which one year must have been as second or only mate of a foreign-going steamship.

In Navigation.—In addition to the qualifications required

for a second mate, an only, or first mate must be able to find the true bearing of the sun and the error of the ship's compass from an observed azimuth of the sun, both from an altitude and also from the "Time Azimuth Tables," and with the variations given compute the deviation; to find the latitude from a single altitude of the sun off the meridian, and to be able to use and adjust the sextant, and to find the index error by the sun; and also to ascertain the true bearing of the sun and the ship's position by Sumner's method by projection. He must also be conversant with the use of Mercator's chart and be able to find, on either a *true* or *magnetic* chart, the course to steer and the distance from one given position to another; and find the ship's position on the chart from cross bearings of two objects; from two bearings of the same object, the course and distance between the bearings being given; and also the distance of ship from the object at the time of taking the second bearings.

In Seamanship.—In addition to the qualifications required for a second mate, a more extensive knowledge of seamanship will be required, as to shifting large spars, rigging sheers, taking lower masts in and out, how to moor and unmoor ship and to keep a clear anchor, to carry out an anchor; how to manage a steamship in stormy weather, and how to rig purchases for getting heavy weights, anchors, machinery, &c., in and out. He must give satisfactory answers as to the ventilation of holds, and the stowage of explosives. He must be able to describe the effects of the screw race upon the rudder; and the effect produced on the direction of the head of the ship by going [ahead] [astern] with a [right] [left] handed screw when the rudder is [ported] [starboarded]. He must also know how to rig a sea anchor, and what means to apply to keep a steamer with machinery disabled out of the trough of the sea, and lessen her lee drift. How to turn a steamship short round; how to get cast of deep sea lead in heavy weather, and other questions of a like nature appertaining to the duties of the first mate of a steamship, which the examiner may think necessary to put to him.

A Master.—Must be 21 years of age, and have been six years at sea, of which one year must have been as first mate in a foreign

going steamship, and one year as second or only mate; or he must have been six and a half years at sea, of which two and a half years must have been as second or only mate, during the last 12 months of which he must have been in possession of a first mate's certificate.

In Navigation.—In addition to the qualifications required for a second and first mate, he must be able to compute the latitude from the meridian altitude of a star, &c.; he must be able to find the magnetic bearing from equidistant compass bearings of any fixed object when at sea, and compute the deviation therefrom. He must construct a deviation curve upon a "Napier's" diagram which will be furnished by the examiner, and understand the practical application of the same, and give written answers to certain practical questions on the effect of the ship's iron upon the compasses, the method of determining the deviation, and compensating same by magnets and soft iron. He will be required to find the course to steer by compass in order to counteract the effect of a given current, and find the distance the ship will make good towards a given point in a certain time, and to work out practically the correction to apply to soundings taken at a given time and place, to compare with the depth marked on the chart.

In Seamanship.—In addition to the qualifications required of a second and first mate, he must be able to construct rafts and jury rudders suitable for a screw steamship. He will be examined as to his resources for the preservation of the ship's crew in the event of a wreck; as to the management of steamships in heavy weather; as to rescuing the crew of a disabled ship; as to steps to be taken when a ship is on her beam ends; or if disabled and on a lee shore. How to use steam appliances in the event of fire, and the best arrangement for towing vessels under different circumstances, placing ship in dry dock, directing repairs, and the mode of procedure if putting into port in distress with damage to cargo and ship. He must possess a sufficient knowledge of what he is required to do by law, as to entry and discharge, and the management of his crew, and as to penalties, and entries to be made in the official log, and a knowledge of the measures for preventing and checking the outbreak of scurvy on board ship, and the law as to load-line marks, the entries and reports to be

made respecting them. He will be questioned as to his knowledge of invoices, charter party, bills of lading, Lloyd's agent, and as to the nature of bottomry, also bills of exchange, surveys, averages, &c., and such other operations and duties of a like nature, appertaining to the management of a steamship, as the examiner may consider it necessary to touch upon.

T. H. FARRER, Secretary.

THOMAS GRAY, Assistant-Secretary,
Board of Trade, Marine Department,
January, 1881.

NOTICE OF ALTERATIONS IN THE EXAMINATIONS OF
MASTERS AND MATES.

From the 1st of August, 1881, candidates for second, only, first mates', and masters' certificates of competency will, in addition to the present requirements for these grades, be required to pass an examination in the subjects specified below.

* IN NAVIGATION.

A *second mate* will be required to find the time of high water at a given port; to observe and calculate the amplitude of the sun, and to find the error of the ship's compass therefrom, and also the deviation, the variation being given. He must also be able to find the daily rate of the chronometer from error observed, and to find the longitude by altitude of the sun by the usual methods.

An *only mate* will be required to find the true bearing of the sun, and the error of the ship's compass from an observed azimuth of the sun, both from an altitude and also from the "Time Azimuth Tables," and with the variation given compute the deviation; to find the latitude from a single altitude of the sun off the meridian, and also to ascertain the true bearing of the sun and the ship's position by Sumner's method by projection. He must also be conversant with the use of Mercator's chart, and be able to find, on either a *true* or *magnetic* chart, the course to steer, and the distance from one given position to another; to find the ship's position on the chart from cross bearings of two objects; from

two bearings of the same object, the course and distance between the bearings being given ; and also to find the distance of the ship from the object at the time of taking the second bearings.

A first mate will also be required to find the true bearing of the sun from the "Time Azimuth Tables," and with the variation given compute the deviation, and also work out the same problems, on either a *true* or *magnetic* chart, as are required of a candidate for an only mate's certificate. (*See above.*)

A master will also be required to find the true bearing of the sun from the "Time Azimuth Tables," and with the variation given compute the deviation, and work out the same problems, on either a *true* or *magnetic* chart, as are required from the only or first mate. He will also be required to find the course to steer by compass in order to counteract the effect of a given current, and to find the distance the ship will make good towards a given point in a certain time, and to *work out practically* the correction to apply to soundings taken at a given time and place, to compare with the depth marked on the chart.

IN SEAMANSHIP.

Besides the subjects already prescribed in the rules for the ordinary examinations, candidates for second, only, first mates', and masters' certificates of competency, will be required to give satisfactory answers as to their knowledge of the additional subjects (applying more particularly to steamships) which are specified in the rules of examination for certificates of competency for foreign-going steamships.

T. H. FARRER, Secretary.

THOMAS GRAY, Assistant-Secretary,
Board of Trade, Marine Department,
January, 1881.

MERCHANT SHIPPING (CARRIAGE OF GRAIN) ACT, 1880.

TO BE SUBSTITUTED FOR THE OFFICIAL NOTICE ISSUED ON THE
7TH DECEMBER, 1880.

Whereas it is provided by the Merchant Shipping (Carriage of Grain) Act, 43 & 44 Vict., chap. 43, section 5, "that the pre-

cautions required by the said Act to be adopted by ships laden with a grain cargo at a port in the Mediterranean or Black Sea, or on the coast of North America, shall not apply to ships loaded in accordance with regulations for the time being approved by the Board of Trade ":

And whereas the Board of Trade have for the time being and until further notice, and subject to the additional regulations set out in the second schedule below, approved of the regulations, so far as they relate to the stowage of grain cargoes, of which the titles and dates are set forth in the first schedule below :

Now, therefore, this is to give notice that the precautions required by the said Act to be adopted by ships laden with a grain cargo shall not apply to ships laden at a port on the Coast of North America, in accordance with the regulations numbered 1 to 7, of which the titles and dates are set forth in the first schedule hereto, so far as those regulations relate to the stowage of grain cargoes; and in accordance with the additional regulations set forth in the second schedule appended hereto.

FIRST SCHEDULE.

1. The Rules of the New York Board of Underwriters, dated at the office of the Board of Underwriters, 51, Wall Street, New York, October, 1860, as amended in October, 1876, and signed by Charles Dennis, Secretary.

2. The Rules of the United States "Lloyd's," dated at the office of Higgins and Cox, attorneys for the subscribers at United States "Lloyd's," New York, 1st October, 1874, and as amended by letter of Messrs. Higgins and Cox, dated New York, December 2nd, 1880.

3. The Rules of H. S. Vining's Bureau of Inspection, viz., rules to be observed by vessels loading grain, and also grain and general cargoes, in the ports of New York, Baltimore, Philadelphia, and Boston, under the inspection of the undersigned. Signed on the 1st July, 1880, H. S. Vining, Inspector.

4. The Regulations of the Orient Mutual Insurance Company, signed at the office of the Orient Mutual Insurance Company, 43, Wall Street, New York, February, 1874.

5. The Rules of the Phenix Insurance Company, dated

1st September, 1879, at the Phenix Insurance Company, 17, Congress Street, Boston, viz., rules to be observed by vessels loading grain and also grain and general cargoes, in the ports of Boston, Baltimore, Philadelphia, and New York, under the inspection of the undersigned, and signed by Eben Howes and George W. Gregerson.

6. The Rules of the Board of Marine Underwriters, viz., regulations for vessels loading grain at the port of Philadelphia, dated the 10th No. 17, Merchants' Exchange. Approved by the Board of Marine Underwriters, 1st July, 1871, and signed Henry D. Sherrerd, Secretary, Board Marine Underwriters; Thomas G. Munroe, James Rowland, W. F. Shankland, Surveyors.

7. Acts and rules relating to the loading of grain in ships at the ports of Montreal and Quebec. Rules and bye-laws of the office of the Port Warden, harbour of Montreal, signed, D. R. Kerr, Port Warden, 1879, Montreal; John Dick, Port Warden, 1871, June, Quebec.

SECOND SCHEDULE.

N.B.—In all cases in which the regulations as to the stowage of grain cargo set forth in the first schedule above do not contain the express provisions contained in this second schedule, then such of the following regulations, if any, as are not included in the regulations set forth in first schedule must also be complied with. If such of these regulations as may not be included in the regulations set forth in the first schedule are not also complied with, the precautions required by the Merchant Shipping (Carriage of Grain) Act, 1880, must be taken.

1. That shifting boards must extend to the keelson.
2. That there shall not be carried between the decks, or if the ship has more than two decks, between the main and upper decks, any grain in bulk, except such as may be necessary for feeding the cargo in the hold, and is carried in properly constructed feeders.
3. That grain carried in bulk must be supplied by proper feeders, or else secured by bags of grain or other cargo.

T. H. FARRER, Secretary.

THOMAS GRAY, Assistant-Secretary,
Board of Trade, Marine Department,
31st December, 1880.

Copies of a Pamphlet, containing the Rules and Regulations included in the first schedule above, can be obtained through any bookseller or chartseller; or of J. D. POTTER, 81, Poultry, London; or E. STANFORD, 55, Charing Cross, S.W.

RUSSIAN IMPORT DUTIES.

The Emperor has approved and ordered to be carried out a proposal of the Imperial Council :—

"1. To replace the Customs duties on foreign salt, laid down in Article 49 of the Tariff for European Commerce, approved by His Majesty the Emperor, on the 5th of July, 1868, by the following duties, which will be levied from the 1st of January, 1881,—(1) Salt imported by land and by sea, with the exception of the places indicated, per pound, 20 copecks; (2) salt imported by the ports of the Province of Archangel, per pound, 10 copecks. 2. The immunities existing for salt imported by the Mourmanian coast, and the prohibition to import salt by the ports of the Black Sea and the Sea of Azoff, are maintained. 3. Foreign salt the customs duties upon which have not been paid on the 1st of January, 1881, will pay the import duties laid down in Article 1. 4. From the 1st January, 1881, additional Customs duties of 10 copecks per rouble (10 per cent.) of the import duties payable on goods imported by the European and Asiatic frontiers will be levied, except on (a) salt, and (b) Turkish and Persian goods imported by the land frontiers of Turkey and Persia, by the Trans-Caucasian ports of the Caspian Sea, and by the port of Astrakhan. 5. These 10 per cent. additional Customs duties will be levied in gold, like all import duties, and will be paid on all goods not taken out of bond on the 1st January, 1881. 6. Foreign goods deposited in the Customs warehouses after the 1st of January, will pay for such warehousing a due double of that indicated in the 3rd section of the Annex to the first observation of Article 933 of the Customs Regulations ('Code of Laws, vol. vi.,' continuation of 1876.) The double due will not be imposed upon foreign goods deposited before the 1st of January, 1881, until after the expiration of the quarter of warehousing commenced in the current year, and that in accordance with section 2 of the Annex above referred to."

LIGHTS FOR FISHING VESSELS.

In pursuance of the recommendations contained in the Report of the Select Committee of the House of Commons on the Lights for Fishing Vessels (Parliamentary Paper 285, Session 2, 1880), the Admiralty, the Board of Trade, and the Trinity House re-appointed the Committee to which had been referred the International Steering and Sailing Rules for Preventing Collisions at Sea, in order that they might reconsider Article 10 of the recent Regulations relating to fishing vessels.

The Committee met on the 5th January, 1881, and now recommend—

1. That all fishing vessels, when not actually fishing and attached to their nets, trawls, or lines, should be required to carry and show the same lights as other vessels under similar circumstances.

2. That a drift net fishing vessel, when fishing and attached to her nets, should carry two white lights to show not less than three miles, to be visible all round the horizon, to be six feet in vertical height one above the other, but not necessarily one immediately over the other.

3. That a trawling vessel when at work should carry two lights, both to show two miles all round the horizon—the red light to be at the masthead forward of and at least six feet in vertical height above the white light.

4. That a trawling vessel with her gear fast shall show the same light as a vessel at anchor.

5. That a decked fishing vessel not exceeding 20 tons shall carry the same lights as open fishing and other boats.

COMMISSION OF THE DANUBE.

REVISED TONNAGE TARIFF.

Board of Trade, February 9, 1881.

The Board of Trade have received through the Secretary of State for Foreign Affairs a despatch from the British Delegate upon the European Commission of the Danube, reporting the adoption by that Commission of the following modification of their Tariff:—

EUROPEAN COMMISSION OF THE DANUBE.

Modification of Annex B of Public Act relating to the Navigation of the Mouths of the Danube.

TARIFF of Navigation Dues to be levied at the Mouth of Sulina.

The European Commission of the Danube decided at its meeting at Galatz, on the 31st of December, 1880, to abolish, from and after the 1st of February, 1881, Articles 1 and 2 of the above-mentioned tariff, and to adopt, in lieu of them, the following Articles :—

Art. 1. Every sailing-vessel or steam-vessel measuring 100 tons at least, leaving the Port of Sulina to put to sea, and which carries, according to its bills of lading or its manifest, a cargo equivalent to more than a third of its tonnage, pays per ton, and according to its total tonnage, a fixed navigation due, the amount of which is determined in francs and centimes, by the following table :—

Taxable Tonnage.	Dues to pay by Vessels which have Loaded.	
	In the Port of Sulina.	In another Port of the River.
	frs. cs.	frs. cs.
Of 100 to 150 tons	0 40	0 70
„ 151 „ 200 „	1 00	1 35
„ 201 „ 250 „	1 45	1 80
„ 251 „ 300 „	1 80	2 20
„ 301 „ 400 „	2 10	2 50
„ 401 „ 500 „	2 30	2 70
„ 501 „ 600 „	2 40	2 85
„ 601 „ 700 „	2 45	2 95
„ 701 „ 800 „	2 50	3 00
Of more than 800 „	2 55	3 05

Art. 2. The navigation dues determined by the preceding Article shall be fully levied when the depth of the pass at the Sulina Mouth, taken in conformity with Article 16 of the present Tariff, shall be 15 English feet at the least.

If the depth of the said pass falls below 15 feet, the amount of

dues established by the preceding Article shall be reduced by 15 per cent. per English foot of diminution of depth, but this reduction can never exceed the proportion of 75 per cent. corresponding to a minimum depth of 10 English feet, consequently the maximum reduction of 75 per cent. shall continue to be applied whatever may be the amount of depth of the pass below 10 English feet.

OFFICIAL INQUIRIES AT HOME, 1880-1.

858. *Muriel*, s.s.; built at Middlesborough, 1880; owned by Mr. E. W. Swan; tonnage, 885; Philadelphia to Hull; maize; suffered considerable damage in a gale of wind, November 25, 1880. Inquiry held at Middlesborough, January 6, 1881, before Coleman, Judge; Holt and Beasley, N.A. Damage caused by stress of weather.

859. *City of Montreal*, ship; built at Quebec, 1873; owned by Mr. R. Hunter, of Greenock; tonnage 1,186; Quebec to Greenock; timber; abandoned at sea, December 3, 1880. Inquiry held at Greenock, January 7, 1881, before Brymner and Erskine, J.P.; Ward and Murdoch, N.A. Abandonment justifiable. Master not in default.

860. *Rosamond*, s.s.; built at South Shields, 1880; owned by Mr. R. Lewis; tonnage, 424; Porman to Mostyn, North Wales; iron ore; lost by striking some object under water off Tarifa Point, November 25, 1881. Inquiry held at Liverpool, January 8, 1881, before Raffles, Stip. Mag.; Curling and Harland, N.A. Loss occasioned by striking some object in the vicinity of the Cabezos Shoals, the Court suspecting that she struck the shoals themselves. Master reprimanded for not taking every precaution for the navigation of his ship.

863. *Summer Cloud*, barquentine; built at Cleveland, Ohio, 1864; owned by Mr. R. Aitken; tonnage, 323; Campbelltown, New Brunswick to Dumfries; timber; lost on Barnhowne Bank, Solway Firth, December 9, 1880. Inquiry held at Leith, Jan. 12, 1881, before McIntosh and Wilkie, J.P.; Ward and Murdoch, N.A. Master guilty of error of judgment in endeavouring to navigate an unlighted channel at night time. Reprimanded.

864. *Eleniore*, s.s.; built at Sunderland, 1880; owned by R. Sharp and others; tonnage, 454; Tyne to London; coals; on the Scar Rocks, October 28, 1880. Inquiry held at Sunderland, January 7, 1881, before Booth and Ritson, Judges; well and Forster, N.A. Casualty due to stress of weather. Master exonerated.

865. *Druid*, schooner; built at Greenock, 1857; owned by R. T. Gibbs; tonnage, 232; Irvine to Lisbon; coals; supposed to have foundered at sea. Inquiry held at Glasgow, Jan. 12, 1881, before Graham and McCulloch, J.P.; White and Holt, A. Court could form no opinion as to cause of loss.

866. *Fanchon*, barque; built at Digby, N.S., 1874; owned by J. Bingay; tonnage, 597; Charleston to Cette; stores; abandoned at sea, December 9, 1880. Inquiry held at Belfast, January 13, 1881, before Plunkett, Judge; Parfitt and Vaux, N.A. Abandonment justifiable.

867. *Goshawk*, ship; built at Bath, State of Maine, 1863; owned by Hadden and Wainwright and others; tonnage, 1283; under charter to New Orleans; ballast; lost between the Lizard and Blackhead, December 20, 1880. Inquiry held at Liverpool, January 11, 1881, before Raffles, Judge; Harris and Kennedy, N.A. Master in default for standing into the land at night without using lead. Certificate suspended for three months.

868. *Charles*, schooner; built at Barnstable, 1834; owned by M. Leary, of Clonakilty; supposed to have been lost at sea. Inquiry held at Cork, January 14, 1881, before Mitchell, Judge; Burney, Clark, and Anderson, N.A. No evidence before Court to warrant coming to a positive conclusion as to cause of disaster. Boat from the s.s. *Pelican* went alongside the *Charles* on November 18, 1880, but the crew either would not or could not save her.

869. *Sir Walter*, s.s.; owned by the Edinburgh Shipping Company; tonnage, 275; Leith to Newcastle; lead; in collision with an unknown vessel which foundered, when all hands were lost, January 21, 1880. Inquiry held at Leith, January 21, 1881, before Garland and McIntosh, J.P.; Burney, Murdoch, and Clark, N.A. Unknown vessel brought the calamity upon herself;

both the master and mate of the steamer acted somewhat imprudently, and were reprimanded.

876. *Spey*, s.s.; built at Dundee, 1880; owned by Mr. James Mitchell and others; tonnage, 649; Dundee to Burntisland; water ballast; lost near North Carr Beacon, Fifeness, December 22, 1880. Inquiry held at Dundee, January 15, 1881, before McGavin and Simpson, J.P.; Curling and Ward, N.A. Master in default for careless and unskilful navigation. Certificate suspended for six months.

878. *Penwith*, barquentine; built at Hayle, 1878; owned by Bain and Co.; tonnage, 288; supposed to have foundered at sea. Inquiry held at Cardiff, January 17, 1881, before Jones, Judge; Pickard and Comyn, N.A. No evidence before the Court upon which to form an opinion as to cause of loss.

880. *Clansman*, barquentine; built at Bideford, Prince Edward's Island, 1878; tonnage, 566; Swansea to Valparaiso; coals; supposed to have foundered at sea. Inquiry held at Swansea, January 24, 1881, before Fowler, Judge; Aplin and Anderson, N.A. No evidence before the Court upon which to form an opinion as to cause of loss.

881. *Earl Percy*, s.s.; built at Jarrow-on-Tyne, 1865; owned by the Tyne Shipping Company; tonnage, 607; Newcastle to London; general cargo and passengers; stranded on the Hasborough Sand, December 23, 1880. Inquiry held at Westminster, January 18, 1881, before Rothery, Wreck Commissioner; Vaux and Ronaldson, N.A. Mate guilty of error of judgment in altering the course ordered to be steered by the master. Certificate not dealt with.

882. *Bengairn*, barque; built at Liverpool, 1868; owned by Mr. A. Rae; tonnage, 590; Dunkirk to Liverpool; ballast; stranded off Dungeness Coastguard Station, December 29, 1880. Inquiry held at Liverpool, January 26, 1880, before Raffles, Judge; Wilson and French, N.A. Casualty caused by negligent navigation on the part of the master. Certificate suspended for three months.

884. *Transit*, ship; built at Granville, Nova Scotia, 1849; owned by Mr. C. Hill, of Bristol; tonnage, 886; Liverpool to Quebec; ballast; lost between Tigrish and North Point, Prince

ward Island, October 24, 1880. Inquiry held at Liverpool, January 29, 1881, before Raffles, Stip. Mag.; Wilson and Nich, N.A. Master in default for steering too westerly a course, neglecting the lead, and for not hauling off the land when he sighted the light. Certificate suspended for three months.

885. *Active*, s.s.; tonnage, 200; lost near Maenheere rocks, January 4, 1881. Inquiry held at Swansea, January 28, 1881, before Fowler, Judge; Castle and Kennedy, N.A. Master in default for negligent and unskilful navigation. Certificate suspended for three months.

886. *Scotia*, s.s.; built at Govan, 1866; owned by Messrs. Anderson Brothers, Glasgow; tonnage, 834; Boston to Glasgow; general cargo; stranded on a reef at the S.W. end of Sanda Island. Inquiry held at Glasgow, January 28, 1881, before Dean and Lammie, J.P.; Ward and Parfitt, N.A. Master to blame for want of proper and seamanlike care when navigating in such close proximity to the land. Certificate suspended for three months.

887. *Lumley Castle*, s.s.; built at Low Walker, 1870; owned by the Northumberland Steam Shipping Company; tonnage, 1076; New Orleans to Revel; cotton; lost on Horns Reef, December 20, 1880. Inquiry held at North Shields, January 28, 1881, before Sutton and Tully, Justices; Hight and Beasley, N.A. Casualty due to wrong courses having been steered and neglect of the lead. Master's certificate suspended for six months; recommended for one as mate during that period.

OFFICIAL INQUIRIES ABROAD.

881. *Braemar Castle*, s.s.; and *Breconshire*, s.s.; in collision at Penang Harbour, October 28, 1880, when the *Braemar Castle* was sunk. Inquiry held at Penang, November 4, 1880. Master of *Breconshire* guilty of error of judgment. Censured.

882. *Oleander*, barque; foundered at sea, November 17, 1880. Criminal Court held at Valparaiso, November 29, 1880. Master acquitted in abandoning the vessel.

868. *Polly*, s.s.; stranded opposite Pilot Station at Moreton Island. Master responsible for accident in leaving the deck in charge of an officer. Censured.

870. *Courier*, brig; burnt at sea. Naval Court held at Rio, December 10, 1880. Accident due to spontaneous combustion. No blame attached to master.

871. *Argosy*, brigantine; lost on the coast of Brazil, Dec. 3, 1880. Naval Court held at Pernambuco, December 21, 1880. Master guilty of imprudence in approaching the land so closely without taking a cast of the lead. Censured.

872. *Star*, schooner; lost on the Murray Reef, October 20, 1880. Inquiry held at Freemantle, West Australia, November 18, 1880. Master guilty of neglect in not using the lead. Certificate suspended for eighteen months.

873. *Lochnagar*, barque; stranded on the beach at Poverty Bay, October 27, 1880. Inquiry held at Gisborne, New Zealand, November 4, 1880. Beached by the master in consequence of the chains parting. No blame attached to any one.

875. *Hannah Broomfield*, brigantine; lost at Inconstant Point, Port Nicholson, New Zealand, October 4, 1880. Inquiry held at Wellington, October 8, 1880. Casualty due to the vessel missing stays and going ashore. Master free from blame.

877. *Tamana*, barque; lost by fire at Olehleh, Acheen, November 5, 1880. Inquiry held at Penang, November 19, 1880. Fire caused by spontaneous combustion. Master in default for not taking steps to prevent the vessel becoming a total loss, and for abandoning her prematurely. Censured.

879. *Robert Godfrey*, barque; lost at Capo Santo Vito, December 26, 1880, Naval Court held at Palermo, January 6, 1881. Master in default for getting his vessel too close on a lee shore. Certificate suspended for three months.

883. *Gaucha*, barque; lost at Santa Anna, November 6, 1880. Naval Court held at New Orleans, December 29 and 30, 1880. Master guilty of misdemeanour as to the loss of the ship, and also of fraud in having obtained and produced false papers in Court. Certificate cancelled. Mate's certificate suspended for twelve months.

888. *Douglas*, s.s.; lost on an unknown pinnacle rock between Passage Island and North Tit Rocks. Naval Court held at Foo-chow, December 14, 1880. No blame attached to master or officers.

889. *Frankfort Hall*, barque; burnt and abandoned at sea, November 30, 1880. Naval Court held at Valparaiso, December 24, 1880. Fire due to spontaneous combustion. Abandonment justifiable.

890. *Flying Scud*, barque; lost at Port Elizabeth, September 1, 1880. Inquiry held at Port Elizabeth, September 10, 1880. Accident caused by parting of cables. Master free from blame.

MERCANTILE MARINE LEGISLATION AND THE LOAD-LINE QUESTION.

THE following extracts from a speech delivered at the meeting of the United Chamber of Shipping by the Hon. Evelyn Ashley, M.P., Parliamentary Secretary of the Board of Trade, are of the highest importance:—"I know of old the dread which Mr. Glover in particular and shipowners in general have of legislation, and how much a jubilee, or year of no legislation, would rejoice them. (Hear, hear.) Well, I think I am not transgressing official decorum when I say I believe you will have a jubilee this year, as far as actual legislation is concerned. . . . Let me say, in regard to legislation, that the Board of Trade proposes to prepare a bill this session, though not to pass it. It is not a harassing or annoying form of legislation, but one which I hope you will gladly assist us in carrying out. The Board of Trade are in the dilemma of having to stop vessels for unseaworthiness, and to prosecute shipowners for sending unseaworthy vessels to sea, while they are not able to do what they would gladly do if they could. They cannot tell the shipowner who may wish to come to them to know what he must do to make his ship seaworthy, where he must put his load-line, and what he must do to avoid being stopped by the Board, or

pulled up for omissions. Many shipowners would like to have that sort of information given to them, but the Board of Trade are unable to give it, and if they did do such a thing it would be taking the responsibility from the shoulders of the shipowners. (Hear, hear.) By the very constitution of the Board of Trade it would have to insist upon a maximum of safety, under every conceivable condition, and therefore it would be obliged to give such stringent directions as would hamper the shipowner in his business of navigation. Desiring not to hamper but to assist him, the Board has been thinking of a scheme whereby they propose to institute a sort of Court, composed partly of scientific, partly of official members, and very largely of the leading shipowners of the day, which shall have power to instruct any shipowner as to where the load-line of his vessel should be, and what are the conditions which will admit of his vessel sailing with safety and regard to the law. The leading shipowners would be ready to come forward and join in maintaining the tone of such a Board, and in imposing on erring brothers such conditions of safety as they themselves always maintained and observed. The idea of the President of the Board of Trade is that a bill should be introduced into the House of Commons embodying such a tribunal as this, not with the idea of carrying it this session, but that it should be referred to the Committee on Merchant Shipping, which sat last session, and which, I believe, is to meet again this, to carry on their deliberations and take further evidence. The details are all in embryo, but the leading idea is this, that the best men of the shipowning class should be the legislators on these points for shipowners themselves. (Hear, hear.) I think the principle is a sound one, and that many gentlemen who hear me will be willing to co-operate with the Board of Trade if such a matter is brought before the Houses of Parliament."—[To all of the foregoing the *Nautical Magazine* most heartily says, "Hear, hear."]

THE
NAUTICAL MAGAZINE

FIFTIETH YEAR.

VOLUME L.—No. IV.

APRIL, 1881.

GRAIN CARGOES.

THE large and influential deputation which waited upon the President of the Board of Trade on the 11th of March gave expression to the discontent which the practical working of the Grain Cargoes Act of last session has evoked amongst shipowners, and especially amongst those of them who are interested in single-decked ships engaged in the Mediterranean and Black Sea grain trades. It is impossible not to appreciate the force of the arguments laid before Mr. Chamberlain, and it is only fair to say that in his reply to the deputation (which we print *verbatim*), the Right Hon. gentleman showed a gratifying readiness to do what he could to mitigate or remove any hardship or injustice inflicted by the Act. Fortunately, the fifth section gives the Board of Trade practically absolute discretionary power. It enables them, if they choose, to lay aside all or any of the precise precautions required by the Act, and to approve of any regulations or plans that they may see fit. It is, therefore, not too much to say that it rests entirely with the Board of Trade whether the Act ultimately proves a success or a failure. It is quite certain that it is not clearly worded. The fourth section, in particular, is so verbose and obscure as to be almost unintelligible, and, as might

be expected, it is this section that has given rise to so much complaint as regards single-decked ships. It enacts (sub-section *b.*)

“(b.) Where grain (except such as may be carried in properly constructed feeders) is carried in bulk in any hold or compartment, and proper provision for filling up the same by feeders is not made, not less than one-fourth of the grain carried in the hold or compartment (as the case may be) shall be in bags supported on suitable platforms laid upon the grain in bulk : Provided that this regulation with respect to bags shall not apply—

“(i.) To oats, or cotton seed ; nor

“(ii.) To a ship which is a sailing ship of less than four hundred tons registered tonnage, and is not engaged in the Atlantic trade ; nor

“(iii.) To a ship laden at a port in the Mediterranean or Black Sea, if the ship is divided into compartments which are formed by substantial transverse partitions, and are fitted with longitudinal bulkheads or such shifting-boards as hereafter in this section mentioned, and if the ship does not carry more than one-fourth of the grain cargo, and not more than one thousand five hundred quarters, in any one compartment, bin or division, and provided that each division of the lower hold is fitted with properly constructed feeders from the between decks ; nor

“(iv.) To a ship in which the grain cargo does not exceed one-half of the whole cargo of the ship, and the rest of the cargo consists of cotton, wool, flax, barrels or sacks of flour, or other suitable cargo, so stowed as to prevent the grain in any compartment, bin or division from shifting.”

Our readers will see from this section that ordinary single-decked steamships, not loaded with oats or cotton seed, are practically compelled to bag not less than one-fourth of their grain cargoes, unless “proper provision” is made by feeders for filling up the bulk grain in the holds. It has been urged that clause (iii.) of this sub-section was intended to draw a distinction between ships engaged respectively in the Atlantic and in the Mediterranean and Black Sea trades. So it undoubtedly does,

but the unfortunate single-decked ship is excluded by its concluding words, for it is obviously quite impossible for her to have "properly constructed feeders from the *between decks*."

The most curious and instructive part of the whole affair is that Mr. Chamberlain and the representatives of the shipping interest in the House of Commons seem to have been alike under the impression that the Grain Cargoes Bill gave effect to the recommendations of the Select Committee to which Mr. Plimsoll's "Bagging Bill" was referred. In moving the third reading, the President of the Board of Trade certainly said so, and added that the Bill had the approval of nine-tenths of the shipowners. No one rose to contest this, and the Bill was allowed to become law as an unopposed measure.

Now let us see what the Select Committee really did recommend as regards British ships loading grain cargoes at Mediterranean and Black Sea ports. Paragraph 9 of their report appears to have been carried without a division, and is in the following terms:—

"British ships sailing from the Black Sea and Mediterranean ports, having compartments separated by permanent partitions extending through the whole depth of the vessel, and fitted with sufficient well-secured longitudinal shifting-boards or bulkheads, carrying not more than one-fourth of their grain or seed cargo in any one such compartment, shall not be required to carry any portion of it in bags."

It is hardly necessary for us to point out that the provisions of the Act are not in accordance with this recommendation.

The suggestion of Mr. Chamberlain that the difficulty may be met by making the hatchways of single-decked ships large and high, and his intimation that such hatchways will (if the longitudinal shifting-boards are carried to the top) be considered by the Board of Trade as "properly constructed feeders" within the meaning of the Act, is ingenious, and will doubtless be largely responded to, but we cannot think that the plan will finally set the matter at rest. No doubt *some* single-decked steamers, especially those with plenty of beam, may very properly be so fitted, but certainly not all. It must not be forgotten that these high

hatches will practically constitute deck load, and it is clear that in certain types of vessels they will actually constitute a new danger. We think it will be at once conceded that the arrangement proposed cannot be universally adopted for single-decked vessels. Therefore it follows that those for which it is not available will still be forced to bag a fourth of their grain cargoes, and will thus be heavily handicapped in competing with others, or that they must submit for approval under clause five some alternative scheme. Besides, it may very pertinently be asked whether those single-decked ships to which the concession is granted will not be advantageously placed as compared with vessels with more than one deck.

We cannot help thinking that the best course would have been, and still is, for the Board of Trade to issue a "notice" to the effect that the regulation with respect to bags laid down in clause (b) of section 4 of the Act, shall not apply to a ship loaded at a port in the Mediterranean or Black Sea if the ship is divided into compartments which are formed by substantial transverse partitions, and are fitted with longitudinal bulkheads or such shifting boards as are mentioned in section 4 (c), and if the ship does not carry more than one-fourth of her grain cargo, and not more than 1,500 quarters in any one compartment, bin or division, and provided that in the case of a ship with more than one deck each division of the lower hold is fitted with properly-constructed feeders from the between-decks.

We have already pointed out what important powers are given to the Board of Trade under this section, and it may interest our readers to know exactly how they have been exercised up to the present time. Four "Official Notices" have been issued. The first dispenses with the precise precautions of the Act in the case of ships loaded under different rules and regulations in force at the various Atlantic ports. This, however is not done absolutely, but requires that the provisions of the second schedule appended to the notice shall be also complied with in those instances in which the rules under which ships are loaded do not contain such provisions. Now, we certainly think that the success which has attended these rules would have fully justified the Board of Trade

in approving them without reservation, and it would have saved much confusion if they had felt able to do so. The second "Notice" allows "bales of cotton, bales of grass, bags of flour, or other suitable cargo" to be substituted for grain in bags, where one-fourth of the grain is, by the fourth section of the Act, required to be bagged in the absence of feeders. But this concession is confined to ships engaged in the Mediterranean and Black Sea trades. We are at a loss to understand why it has not also been conceded to those employed in the Atlantic trade. The third "Notice" enables ships loading cargoes of oats or cotton seed at Mediterranean or Black Sea ports to carry oats or cotton seed between the decks under certain conditions, and the fourth sets forth the conditions under which the Board of Trade will be prepared to consider plans for feeding the holds of single-decked ships, with a view to their approval under section 5 of the Act.

The issue of these "Notices" is evidence of the willingness of the Board of Trade to exercise their statutory powers, and we cannot but feel that any really safe plan alternative to the precise precautions laid down by the Act will receive every consideration at their hands. As we have said before, the success or failure of the Act rests entirely with the Board, and it is hardly likely that they will fail to avail themselves of any opportunity that may present itself for making it as workable and efficient as they can. Of course the responsibility thrown upon them is heavy, and must be exercised with caution. At the same time it will have to be largely exercised, for it is notorious that the Act, which ought to be intelligible to an ordinary shipmaster, has puzzled both technical and legal experts over and over again. The Board of Trade must let shipowners know exactly what they expect them to do, and we feel sure that shipowners will cheerfully comply with every reasonable requirement.

The following is the speech of the Right Hon. the President of the Board of Trade at the Council Chamber, Whitehall Gardens, on Friday, the 11th March, in reply to a deputation which waited upon him to urge the propriety of some alteration or modification of the provisions of the "Merchant Shipping (Carriage of Grain)

Act, 1880," and to bring forward for consideration other matters connected with his department :—

Mr. CHAMBERLAIN: Sir Edward Reed, Colonel Hill, and Gentlemen, I am very pleased to have the opportunity of meeting so large, influential and representative a body of the great interest with which my department is so intimately concerned; and I am only sorry that I should have been obliged in any way to shorten the speeches which have been made to me, but I am not entirely my own master in that respect. I am glad at all times to have the opportunity of meeting your representatives. I suppose, however, I may assume, judging from the members present here to-day, as well as from what I have seen in the circulars which have been issued with reference to it, that your intention in coming here is rather to make a demonstration than to discuss details at any great length. Under these circumstances, although I shall have to go a little into details in answer to some of the speeches made, I would lay the greatest stress upon some few general observations. Certainly it is extremely desirable that a department like this of the Board of Trade should be fully informed of the opinions of the great shipping interest with which it has to deal; and I think it is perfectly natural that you should make this demonstration as expressing in the strongest possible way your objections to anything in the shape of interference with your industry or trade in any form whatever. I must, however, point out to you that it would be perfectly easy to get up another demonstration equally important (if it were desirable) in another sense. (Cries of "No, no.") Pardon me, I know enough of the public opinion of this country to be aware that nothing would be easier than to get a most important and influential deputation—(Cries of "No")—to urge upon the Board of Trade greater and more stringent restrictions upon your industry.

A MEMBER: Not of shipowners.

Mr. CHAMBERLAIN: Not of shipowners, certainly not. Just let me call your attention to some few facts. It is well you should know the truth in this matter, at all events that you should consider the other side. Now take the statistics for the last three months—December, January, and February—I find that

326 vessels have been totally lost, and that 717 lives have been sacrificed. I find of these, 25 vessels, with 40 lives lost, were laden with grain; 77 vessels, with 197 lives, were laden with coal; and that 244 vessels, with 480 lives, were laden with general cargoes. Now I am totally unable to bring myself to believe that in all the cases these casualties which we all deplore can fairly be described as the "act of God;" I don't believe that in every one of these cases it can be asserted that everything was done which ought to have been done to secure life and property, or that all necessary and reasonable precautions were taken; and I don't believe there is a single gentleman here who would be more inclined than I myself to maintain such an extreme view as that. What I have to represent to you is this, that it seems to me that it is to the interest of every respectable shipowner to co-operate with the Board of Trade in England—(hear, hear)—in eliminating all unnecessary causes of loss and misfortune. (Hear, hear.) It is to your interest to help us to bring up all the bad shipowners to the practice of the good shipowners, and it will be our business to make the interference which is necessary for this purpose as little harassing as we possibly can. (Hear, hear.) Perhaps I had better, in the first instance, dispose of some of the minor questions which have been brought before me. The question of light dues is no doubt one of importance, and I shall be glad to consider any information which may be laid before me on the subject. I would point out, however, as I have already done to Colonel Hill, that the real decision in a matter of that kind, affecting as it does the Revenue of the country, must rest with the Treasury and not with the Board of Trade, and we should have only a consultative voice in any such question. I may also point out that since the year to which I think the Provost of Glasgow referred as that of the report of the Committee of 1845, from whose report he quoted some extracts, the dues have been considerably reduced; that in the case of foreign trade since 1863, the reduction has been five per cent., and that in the case of the coasting trade there has been a still larger reduction; but the question of policy as to whether such dues should or should not be undertaken as part of the

national expenditure, or whether they should be levied in the interest of those concerned, is a subject which deserves and shall receive our best consideration. (Hear, hear.) As regards the question of overtime at the Customs, that also is a matter which exclusively concerns the Treasury, and I would venture to suggest that your recommendations on that point should be sent to the Chancellor of the Exchequer. As regards the Payment of Seamen's Wages Bill, and the inconvenience which has been suffered in reference to that matter, I would point out that, in order to meet the wishes of the shipowners, the new arrangement with regard to advance notes upon which the whole Bill turns has been postponed to the 1st August; and it will be impossible to say what the ultimate effect of that Bill will be until this arrangement comes into operation. I would also remind you, as I have already done upon the general question, that there is another side to this matter, and that there is a strong opinion outside the shipowning interest that the shipowners have no right to demand those powers which we have not conceded to any other employers; and that when an alteration of the law took place under which it became impossible to treat a breach of civil contract as an offence in the case of ordinary employment, it was hardly right or proper that that exceptional power should be given to shipowners. We have not altogether laid down an arbitrary rule, we have left considerable power which I hope may, at all events as the operation of the law becomes better understood, remove the grievance which I know exists, and which I hope in a short time will be greatly diminished. The question of fees on engagement and discharge has been brought before us on many occasions. There is the question of difference of opinion between the Board of Trade and the shipowners as to the expense which may be fairly debited to this fund, and we consider we are entitled to debit certain expenses which reduce the balance very materially, but at the same time the whole subject is one which shall receive further consideration. As regards the point contained in your resolution, in respect to Courts of Inquiry, that where these Courts inquire into the loss of vessels, the various interests involved shall be duly represented, and that not less than two

members of the class who have practical experience shall be represented, these recommendations are already complied with and two Assessors are appointed, and those Assessors are practically acquainted with shipping, either as constructors or as practical sailing-masters. Well, now, I come to what is after all the principal point which has been brought before me by this deputation. I understand that the objection to which this refers is that Naval officers are appointed—(hear, hear)—but that has been entirely altered by recent legislation, and it is absolutely necessary that there should be at least two Assessors who are in the Merchant Service. Well, then, as regards this question of the grain cargoes, Colonel Hill told us that he thought it was shown to the Committee that the loss had been remarkably small. I must take exception to this statement, in the first instance, because in seven years no less than 244 grain-laden vessels have been totally lost, and 2,368 lives have been sacrificed, and that loss is so considerable, taken in the aggregate, that some kind of legislation was absolutely necessary.

Now, the hon. member for Birkenhead has taken exception to the way in which he says the Bill was hurried through Parliament; but there are two ways in which a Bill may be passed through Parliament; and the ordinary way is for the promoters of a Bill to take such discussion as they can, but to maintain as far as they possibly can the integrity of the measure as they bring it in. There is another way of dealing with this question, and that is that the promoters of the Bill should see all the opponents of the Bill and confer with them, and endeavour, if possible, to meet all reasonable opposition.

Now, what was the course I adopted in reference to this Bill; I refused to see no one; on the contrary, I invited every one who had anything whatever to say on this subject to instruct me in what I may say was my ignorance on this question, and I gave every consideration to the representations then made to me. Indeed, I made concessions which I had reason to believe were satisfactory in most cases—(hear, hear)—and which at the same time did not affect the great interests that I had to guard; and it was in that way that oppositions were removed and eliminated, and the Bill

was enabled to be passed without any very lengthened discussion. Well, I admit when I find that a course of that kind gives rise to misapprehension, that it is open to question, whether in future, in any further legislation relating to your interests, by a Bill which I may have to introduce, it would not be better that the whole discussion should take place in public. (Hear, hear.) I find that my friend, Mr. Glover, whose views upon this subject I had put before me at great length and endeavoured to meet, has entirely misunderstood what passed between us. I take exception altogether to the statement he has made with reference to these negotiations—not in the least doubting his good faith in the matter, for that I am perfectly convinced of, but I do dispute altogether the accuracy of his recollection. Now, let me tell you exactly what in my opinion, took place. As he correctly says, the Report of the Select Committee, paragraph 9, proposed that all British ships sailing from the Black and the Mediterranean Ports, &c., &c. (reading down to the words) “in bags.” Now, Mr Glover took exception, on behalf of the Chamber of Shipping and of all the shipping interest generally, to two points in that clause. If he had accepted the clause as it stood there would have been no objection on my part, and the Bill would have gone through in that form; but he took exception on two points, and he objected to the words “permanent provision,” and proposed that the word “substantial” should be substituted; and he objected to the words “one-fourth of the grain cargo in any such compartment,” and he proposed that the words “bin or division” should be added. Now let us see what that means. When those alterations were made there was absolutely no single or double-decked ship in existence which would not be excluded from the provisions of this Bill, and the effect of those suggestions of Mr. Glover, without any other alteration, would have been that the Committee would have been stultified by a side-wind, and provisions which they thought it necessary to make for the safety of those ships would have been altogether nullified; for there is not any single-decked ship which has not four compartments, bins or divisions. You have the transverse bulkheads which shut off the engine-room, and you have therefore two compartments on each side of the

engine-room, and those are divided by longitudinal shifting-boards, and you have four compartments and, therefore, as I say, every single-decked ship would have come under that arrangement. I pointed that out to Mr. Glover, and told him that I could not accept an amendment of that kind, and after considerable discussion we agreed to the insertion of the words "Provided that not more than 1,500 quarters should be placed in any one compartment, and also, that special feeding apparatus is provided." Now, that is the whole gist of these negotiations. The effect of that upon single-deck ships Mr. Glover says he did not foresee; and I can only say that I foresaw it, and I can appeal to my hon. friend, Mr. Norwood, in confirmation of my recollection, because he asked me in the lobby of the House of Commons whether I would be willing to exclude single-decked ships altogether, and I said that I was advised that from the information laid before me and the Committee I could not consent to do so.

So much for the history of the case; and now let us see what the result is:—The result is, that there are three different ways in which single-decked ships may be dealt with. In the first place, one-fourth of the cargo may be in bags of suitable pattern. That is one way. In the second place, feeders may be provided. Well, I am told that practical men say that feeders cannot be provided in single-decked ships, and if they can be provided that they would constitute a new danger. (Hear, hear.) I can only say that I will come to that presently. The third plan of dealing with single-decked ships is under the fifth clause of the Act, which enables the Board of Trade to approve the plan of any ship constructed and loaded in accordance with it. Well, now, with regard to that fifth clause, let me say I entirely agree with what fell from my hon. friend the member for North Durham, that I am perfectly well aware that ships are now being constructed purposely for the grain trade, and they may be safer probably in that respect than any for which arrangements have been provided in this Bill, and if so it will be a great satisfaction to me to approve the pattern and at once relieve them of all restrictions; and every case of that kind will be, I can assure you, dealt with on its merits. (Hear, hear.) Let me go back for a moment to the

question of "feeders." We find that in a great number of single-decked ships the hatchways are made large and high, and in some cases they are three, and even three feet six inches above the deck, and we are at present advised that where the vessels are divided by longitudinal shifting-boards, and where those boards are carried up through the hatchways, then those hatchways do constitute sufficient "feeders" within the meaning of the Act. (Hear, hear.) We have been in communication with shipowners on this subject, and we have informed them in more than one instance that in the present state of our information we are not prepared to decline to regard the hatchways as "feeders" required by the Act. I would only say in reference to that matter that every case will be considered on its merits. I do not say that every hatchway is a "feeder;" but where the hatchways are of this description they will be so regarded until we have reason to doubt the wisdom of the course, if passed by the Board of Trade, as a satisfactory compliance with the Act. (Hear, hear.) I hope that that may, perhaps, remove a considerable proportion of the difficulty that has arisen. (Hear, hear.) I do not know that I need say anything further in reference to this particular question. I should like, however, as I see so many representatives of shipping before me, to say a word about another matter. I understand that no complaint has been made with regard to that part of the Act.

Colonel HILL: But under the 4th section of the Act they are not allowed to take any grain between decks.

Mr. CHAMBERLAIN: With regard to that, the provisions of the Act are precise and specific; there is no question whatever about the intentions of the Committee with respect to that.

Colonel HILL: No; that is not so; we say the Committee understood this clause to mean single-decked ships and longitudinal shifting-boards, as if all single-decked ships would be allowed to take the grain in bulk, and that double-decked ships should be allowed to do the same provided they have "feeders" at the bulkheads; and the Board of Trade on the 11th February, if we understand them rightly—and perhaps we did not—in a communication they made to us, thought that we undertook to take

grain between decks, but we have no such intention, except as regards the hold. Let us put our grain in bulk in the hold, and we shall be satisfied.

MR. CHAMBERLAIN : I shall be very glad to look into that ; I did not understand that there was any special complaint with regard to double-decked ships, but I shall be glad to have put into writing any statement you may wish to make with regard to that matter, and it shall be separately considered. But, as at present advised, according to section A, in sub-section 4, there is a provision which meets that very case—" (a.) There shall not be carried between the decks, or, if the ship has more than two decks, between the main and upper decks, any grain in bulk, except such as may be necessary for feeding the cargo in the hold, and is carried in properly constructed feeders "—and to that there is no exception. The exceptions which we have been dealing with in reference to single-deck ships apply only to sub-section B, and not to sub-section A ; but that is a matter I shall be glad to further consider if you will forward me any further statements on the subject.

I was going to say a word or two with regard to the future. I confess I am not of opinion that the relations between the Board of Trade and the shipping interests are altogether satisfactory. The theory of our past legislation has been to throw the responsibility upon the shipowners—which is a very good theory as far as it goes—and the power has been reserved to the Board of Trade to stop ships which are unseaworthy or improperly loaded, to prosecute shipowners who did not comply with the law. But in practice I think this theory of legislation has almost broken down. (Hear, hear.) In the first place it is very difficult to secure anything like a uniform system. We have able and intelligent officers at the different ports, but it is hardly possible that so many different men, in cases which are so often technical and complicated, should possibly take exactly the same view, and so you get varying decisions at varying times and in varying places. Then, again, the shipowner complains, and not without reason, that he is left in ignorance of what does constitute obedience to the law, that he may be willing to do what is right, but that there is no authority

to tell him what is right, in fact, that he is suffered to commit a wrong and then he is punished for it, and no information is previously given to him as to what is right. (Hear, hear.) And I am a little afraid that we have also to complain that when we do prosecute in some cases which seem clear enough the prosecutions break down, either because the evidence is insufficient to establish a criminal charge, or from some other defect either on the part of the Board of Trade or the legislature; and generally the complaint is made, not I think, unreasonably, that the general effect of this legislation is to shut the door after the steed is stolen. It is when the vessel has gone to the bottom and lives have been lost that the Board of Trade is called upon to interfere, and it will be very much better, if it were anyhow possible, to prevent rather than to punish after the wrong has been done. (Hear, hear.) Well I have carefully considered this subject, painfully considered it I may almost say, ever since I have held my present office, and I have come to the conclusion that it might be possible to establish some tribunal more or less independent, to which many of these technical and complicated questions might be referred. (Cheers.) I might point to the experience of the Railway Commissioners as a case somewhat in point, although what commends itself to my mind is a tribunal more representative than the Railway Commission, not appointed by Government but, to a large extent at all events, elected by shipowners. (Hear, hear.) I have thought that such tribunal would represent the best practice of the best shipowners; and that they might enable us to settle many difficult questions which might be referred to them for their advice and decision. That, in fact, they should constitute a Court of Appeal between the Board of Trade and the shipping interest; and we might even perhaps with their assistance deal with that very vexed question of the load-line—(hear, hear)—and if that could be dealt with, it would enormously simplify both the work of the Board of Trade and the duties of the shipowners. (Cheers.) This is the view which I have entertained; and I had hoped, if the state of public business permitted, to have introduced a Bill to carry out this object into the House of Commons. I had intended, if I could get the second reading of this Bill through with-

out discussion—(laughter)—to get the Bill referred to the same Committee which was appointed last session, and which dealt with the grain cargo question, so that all matters of detail might be thoroughly thrashed out. This is not a party question at all, about which we are in the slightest degree prejudiced—(hear, hear)—but it is one to the consideration of which all parties can come with an anxious desire to carry it out; and then, having come to the decision, for which it had been referred to the Committee, we might hope to get it through the House of Commons, at all events, and make the experiment which it would be well worth trying. (Hear hear.)

I thought I would take this opportunity of mentioning this matter to you, because I am glad that it should have your careful consideration; and I hope, in the words of Mr. Glover, that we may, as long as I occupy my present position, I will not say "enter into a conspiracy" as he said, but enter into an alliance to do good and to promote the security of life and property, and the interest of the great enterprise which you represent. (Cheers.)

THE IDENTIFICATION OF LIGHTHOUSES AT NIGHT.

IT is rather difficult to understand who is complaining of the present system of lighthouse distinctions on our coasts, and what stimulates Sir William Thomson to advocate so pertinaciously the adoption of a system which would involve the alteration at a great expense of the majority of the lights now existing. The chief element in Sir William Thomson's arraignment of the present system is the liability of the coast lights being mistaken for ships' lights. It is no doubt possible that a fixed white lighthouse light may under certain circumstances be mistaken for a steamer's masthead light, and that coloured coast lights may be taken for ships' side-lights, but we are of opinion that such an occurrence is extremely rare, and should be glad if Sir William Thomson would furnish duly verified instances of such a

mistake having caused a disaster. It is quite clear that to make so wholesale a change as Sir William Thomson proposes would be attended with the most serious risks to navigation and might be the cause of many casualties. But, as we before said, no other complainants appear and no experienced nautical authorities can be found either to condemn the present system, or to support the methods advocated by Sir William Thomson. This is a remarkable feature of the question, which should be well considered by those not technically acquainted with the subject, who allow themselves to be led away by the plausible utterances of a distinguished man.

We have before commented on the agitation in reference to this matter which has now been kept up for some years, and in common with others have pointed out that there is no crying necessity for the reform proposed; but notwithstanding the representations of those practically acquainted with the necessities of the case, Sir William still rides his hobby, insinuating that things are not as they ought to be, and that the authorities are behind-hand in providing for the requirements of navigation.

This persistent agitation is clearly mischievous in its tendency, it unsettles the mind of the mariner, it calls for judgment from the public who cannot be expected to judge properly in such a matter, and it reflects unjustly upon the authorities charged with the duty of lighting our coasts. As regards the latter, we imagine they are well able to defend themselves if called upon to do so; but in view of the probable disturbance of existing knowledge about lights and their distinctive features in the minds of seafaring people, we think Sir William Thomson assumes a serious responsibility, and that his views should be keenly criticised.

It is needless to recapitulate arguments which have been stated over and over again and which have never been answered; it is sufficient to take one or two points of Sir William Thomson's latest utterance on the subject and to make a few comments.

Sir William Thomson now brings forward something like a definite plan for changing all fixed lights, so as to make them either flashing or occulting, and he gives two small tables indicating the nature and number of the distinctions which he considers would be available in each case.

As regards fixed lights, which we are told number 490 out of a total of 623 on the coasts of the British Islands, we would remind Sir William Thomson that by far the larger proportion of the 490 fixed lights are small pier and harbour lights often shown from ordinary lamp-posts at the ends of piers and jetties, and frequently only exhibited at certain times of tide to show the depth of water over the bar. It would be absurd to require that everyone of these lamp-posts should be fitted with machinery to produce periodic flashes or eclipses, and it would be equally absurd to abolish the use of coloured lights in such situations. Such lights are not required to have a great range, and, as a rule, are found amply sufficient for the purpose. According to Sir William Thomson all these lights must be made to flash or wink, and it is not difficult to understand that, surrounded by nothing but bobbing and winking lights the mariner's head would be in a whirl as to which was the light he wanted; he would have to concentrate all his faculties on counting the flashes or eclipses, probably spending some time over the operation, while, if it had been a fixed white, red or green light, he would have known it directly he sighted it.

Leaving then out of the question the harbour and pier lights and regarding only the important lights intended to assist passing navigation, it will, on examination, be found that in all the British Islands there are not 50 lighthouse stations, whose sole distinctive feature is a single white fixed light, and many of these are so situated that in relation to other lights in the vicinity the seaman has no difficulty in identifying them. It is not that we specially advocate the employment of fixed lights, nor does it appear that the lighthouse authorities particularly favour them, judging from the changes made during the last 10 years; but what must not be lost sight of is the fact that the fixed white light has, in certain cases, a really distinctive value, and that it would be quite unwise to ignore or suppress it as a distinctive characteristic. We have stated that, as regards our principal coast lights, there are not 50 of such lights, but on referring to the French coast we find that excluding harbour, pier and river lights, there are more than 50 single fixed bright lights; and a similar proportion will be found on the Spanish and Italian coasts; while on piers and in harbours

the fixed white lights are quite as numerous as they are with us. In advocating the abolition of all fixed lights Sir William Thomson may be going farther than he is aware of, but certainly the adoption of his advice would land us in difficulties greater than he seems to have contemplated. It would do away with the constant, unchanging light (for which sailors have so strong a liking) in positions where there could be no doubt of its usefulness, and where no danger could arise as regards its being mistaken for the masthead light of a steamer. It would ignore the special merits of the electric light which, as a fixed light, is completely different from all other kinds of light, and can be readily recognised by its own distinctive peculiarities. It would necessitate changes, the carrying out of which could not fail to be perplexing and dangerous to navigation, and which sailors do not want.

We notice that Sir William Thomson's latest proposals differ in one important particular from those which he has on former occasions brought forward. Hitherto he has identified himself with the advocacy of applying the flashes and eclipses of lights to the representation of the short and long symbols of the Morse Telegraphic Alphabet. Each light was to exhibit a combination of long and short flashes or eclipses, which should represent, in accordance with the Morse code, one of the letters of the alphabet, and each lighthouse was to have its own letter. In our January number for 1880 we pointed out not only the practical difficulties which would attend the adoption of such a scheme, but also the serious risks to which mariners would be subject in the carrying out of so wholesale a change as would be necessitated, and also from the liability to erroneous interpretation which would be entailed. Sir William Thomson, we presume, learns as he goes on, for he now discards the association of either letters or numbers with the signals, and contents himself with advocating the abolition of all fixed lights, and the retention of two classes, flashing and occulting. He still adheres to longs and shorts, which he requires to give a sufficient number of distinctions in each class. We assume that, in regard to the Morse Alphabet, Sir William Thomson has yielded to arguments which were too strong for him, and his proposals are accordingly divested of one of the cumbrous

elements which appeared so ludicrously unnecessary and perplexing to seafaring men. But although he says he does not approve of the association of letters or numbers with the signals, he still shows a hankering for it, for he agrees with Mr. Preece that, "while many may find their memory aided, none can be embarrassed by an official statement of the Morse letter corresponding to any group of flashes or eclipses that may be chosen as the characteristic for any particular light."

It is difficult to comprehend what would be the practical use of such an official statement as that to which Sir William Thomson refers. If the association of letters and numbers is discarded, what possible good can come of stating officially the letter which may be indicated by any group of flashes or eclipses. Sir William Thomson apparently surrenders the point, but he will not give it up. He evidently sees that his original idea cannot be practically carried into effect; but like a fond parent, he cannot bear to part from his offspring.

Let us, however, examine what remains of Sir William Thomson's scheme.

For flashing lights he proposes a quarter second flash every two seconds, a half second flash every four seconds, a one second flash every eight seconds, two half second flashes every six seconds, two one second flashes every twelve seconds, three half second flashes every nine seconds, and four quarter second flashes every eight seconds, in all seven distinctions.

For occulting lights he proposes to use one long eclipse (three seconds), one short eclipse (one second), two short eclipses, one short one long, one long one short, three short, two short one long, one short one long one short, one long two short, one long one short, one long one short, in all eleven distinctions.

We cannot understand how Sir William Thomson can believe that sailors will discriminate between quarter, half, and whole seconds, which he proposes in the various lengths of the flashes, and also between 2, 4, 6, 8, 9, and 12 seconds, which he names as the distinguishing intervals between the flashes. Ask any ordinary person to count 20 seconds, and time him in doing so; as a matter of fact it will be found that nine times out of ten he counts 20

in less than 10 seconds, so incorrect an appreciation have the majority of people of the length of duration of a second. We hold that Sir William Thomson's proposals for flashing lights are altogether beyond the appreciation of seamen, and are totally unfitted to supersede the more deliberate yet more certainly recognised distinctions now in operation, which, under the name of group flashing lights, are becoming well known and highly spoken of among nautical men.

In respect of the occulting lights, Sir William Thomson again appears to have overlooked an important matter. It will be seen that in his table he proposes to use as one distinction, "one long eclipse;" as another distinction he will employ "one short eclipse;" again he includes "two short eclipses," and, further, "three short eclipses." Each of these distinctions is to stand by itself, and Sir William Thomson believes they will sufficiently announce themselves to the seaman. But we would ask, by what comparison is the seaman to judge in the above cases whether the eclipse is long or short? Sir William Thomson will probably say the long is three seconds in duration, the short, one second. Well, no doubt the distinction between the two would be sufficiently apparent if a long eclipse immediately followed a short one, or *vice versa*, but in the absence of any direct means of comparison it will be necessary for the seaman to judge whether the eclipse lasts three seconds or one second.

Now the question is, do these proposals offer any certain prospect of improvement as compared with the present means of distinguishing one lighthouse from another? Do they afford sufficient justification for the whole lighting arrangements of the coast to be subverted at an enormous expense? It does not seem reasonable; it certainly is not practical, and we are confident will be condemned by all nautical men as a scheme elaborated by a scientific landsman for use at sea by men who have to confront the practical dangers and necessities of navigation.

THE MEASUREMENT OF YACHTS.

MOST rules which have been in use at different times for obtaining the racing tonnage of yachts for purposes of time allowance have been open to the objection that they encouraged the production of mere racing machines—that is, of types of vessels built for the purpose of eluding the rule, and obtaining an unjustifiably large time allowance. In an article last June, we pointed out that the rule which has been in existence for some years past has had the effect of producing a singularly bad kind of racing machine—ugly, expensive, and inconvenient—in fact, all that a pleasure yacht should not be. In our remarks then it was our fortune to dissent from the published opinions of an eminent authority in the yachting world. Since that time, however, further developments in the same direction appear to have convinced others besides ourselves that something ought to be done to prevent pleasure yachts from becoming as ugly as ironclads, and now the same eminent authority, the yachting editor of the *Field*, has promulgated a proposal for a new rule which has been received with a chorus of exultation by a host of correspondents. The new rule, although it only saw the light on the 15th of January, has secured so much support, that at the meeting of the Yacht Racing Association on the 1st of March it was proposed, and if a two-thirds majority of the members vote for it, it will before this article is in the hands of our readers be the accepted rule of the Association. We are inclined to think that the whole thing has been done much too hastily, and we believe that the new rule will be found to be little if any improvement upon the old one.

The rule which has been in existence for many years was practically the same as the old builders' tonnage, and for a long time it answered its purpose very well. It may be thus expressed—

$$\text{Tonnage} = \frac{(L - B) \times B \times \frac{B}{2}}{2}$$

Roughly speaking, the tonnage varied as the length and the

square of the breadth. Since the power to carry sail varies roughly as the square of the beam, and since the area of sail as regards one of its dimensions depends upon the length of the vessel, this rule, which had the merits of simplicity and antiquity, held its own and did its work well until the introduction of the system of building yachts with large weights of lead on the keel. The stability of the vessel, so far as it depended upon her form, might be measured by her breadth, but her stability could be considerably increased by merely lowering her centre of gravity. Thus a class of vessels has come into existence of small beam and great depth, with large sail area in proportion to their racing tonnage. As compared with the breadth, their length is also excessive. In our former paper on this subject we adverted to the case of a yacht built during the winter of 1879-80 of 90 tons measurement with as much as thirty tons of lead upon her keel: it has recently been stated that this has been outdone, and that a vessel is now on the slip 50 feet long, and to have a nominal tonnage of only 10, but to carry 14 tons of ballast on her keel.

The proposed rule, as we have said, was first made public in January last. Its author expressed his opinion, and, we think, not any too soon, that it was desirable to remit some of the penalty put upon beam. He, however, objected to a rule which would "tamper with depth," on the ground of its unduly restricting liberty of design. At the same time, he admits what in our contention for a reasonable rule we have always insisted upon, that "the three leading elements in yacht design are length, breadth, and depth." The latter two may be regarded as effecting the same purpose—providing the sail carrying powers.

He then goes on to show that in existing yachts sail area is in proportion to length rather than beam. We quote some figures:—

	Tons.	Sail Area to Square of Length.	Sail Area to Square of Breadth.
<i>Sappho</i>	364	·6	14'
<i>Freda</i>	20	·75	21'
<i>Peerless</i>	66	1·20	9'
<i>Bloodhound</i>	40	·74	17'
<i>Columbia</i>	290	·89	16'

We have not had space to give particulars of all the yachts referred to. The five we have taken are of the most diverse types and sizes. It does appear that the square of length is somewhat more nearly proportional to sail area in the several vessels than is the square of the breadth. This is made to lead to the new proposal that tonnage shall depend mainly upon length, and in the second place upon beam. It is :—

$$\text{Tonnage} = \frac{L \times L \times B}{1,200}$$

The division 1,200 is selected, because, by using it, the average result comes nearly as it is under the existing rule. This last feature is necessary to the success of any rule, and, of course, can, under any rule whatever, be secured by using an appropriate constant multiplier or divisor. It will be noted that the vessel in which the proportion of sail area to square of length differs most from the average is the *Peerless*, an American yacht of exceptionally large beam. Under the new rule her tonnage will be reduced from 66 to 39. In an article written in support of the rule, when it was stated that the Yacht Racing Association had resolved to take up the question, the supposed advantages of the proposed measurement are thus summarised :—

$$L \times L \times B$$

"The rule $\frac{\quad}{1,200}$ which we proposed a month ago

can be recommended on account of its scientific merits, inasmuch as it places an approximate value upon the sail-carrying power of yachts, no matter how divergent the types. It will further have the desirable merit of not encouraging one type of yacht more than another, which attribute would prove of great scientific value, it will not disturb existing classes, it involves no new measurements, and is singularly simple in its application." In a subsequent paper it is further stated that "the proposed rule" is put forward on three assumptions :—

"1. That it would put such a just value on yachts of any proportions of beam to length, that there would be neither inducement to build an exceedingly long yacht for a given tonnage, nor an exceedingly broad one.

"2. That the rule will approximately give a value for the sail spread of a yacht ballasted and canvassed for racing, of any type.

"3. That it will give an approximate value for the speed of a yacht of any type."

These are certainly large promises, and if the new rule is capable of doing all this it is certainly a great desideratum. To estimate its scientific value as a measure, it is necessary for us in the first place to inquire what it is that has to be measured. It is certain that large yachts have an advantage over small ones, due simply to their size, and depending upon the fact that the power of a vessel to carry sail increases faster than her resistance, as her size is increased. It is claimed for the new rule that it assesses the sail-carrying power of yachts of various types, and hence it appears desirable to inquire how and in what way sail-carrying power varies with size. Obviously sail area varies directly as the length, other things being the same. Length, depth, fineness, and position of weights being about the same, the sail area might, for an increase in breadth of the vessel, be increased in a larger proportion, for the reason that the moment of stability increases roughly as the cube of the breadth, while the upsetting moment of the sail increases approximately as the square of its height, the area of the sail, of course, increasing directly as its height. The gain in sail area which may be obtained by increasing depth, when a large proportion of the total weight of the vessel consists of a lead keel or of ballast, is very considerable, and might in conceivable cases be much more per cent. than the increase per cent. of the depth. It may be safely concluded that an increase of sail area may be obtained exactly in proportion to increase of length more than in proportion for increase in breadth, and for increase of depth in a proportion varying with special circumstances in each case. Before we leave this part of our subject we would advert briefly to the fact that an argument for the new law has been, that the sail area of existing yachts is said to be nearly in proportion to the square of their lengths. To begin with, the comparison is only true subject to frequent exceptions of 10 per cent. Further, it may be said that, taking existing sail areas and existing dimensions, many rules might be framed on very diverse

systems, which would give tonnages proportionate to sail areas. The true value of any rule is not to be estimated by any manipulation of the figures of yachts built before it comes into operation, but by the possibilities of evasion of its incidence in the future. Breadth, it is granted, has been unduly taxed; length has, perhaps, had less, certainly not more than its fair share of the burden, while depth has gone free of all tax. The consequence has been that breadth has been kept down at all costs, and power has been gained by increased depth, and in a less degree by increased length. In this statement of the facts of the case, interchange the words breadth and length, and we then have a forecast of the inevitable operation of the new law.

We propose further to consider the known laws of resistance as far as they concern the question. The proposer of the new rule, in treating of this branch of the subject, roundly asserts that "it is now accepted as an established law of nature that the speed of vessels moving through water varies as the square root of their lengths, other things being equal," and he then proceeds to give a remarkable and certainly original formula for speed:—

$$.62 \times \sqrt{L^3 \times B}$$

This is based upon an expression given in Mr. W. H. White's *Manual of Naval Architecture* for the rate of speed in well formed vessels, at which one element of the resistance begins to increase very rapidly. The theory of resistance propounded by the late Mr. Froude, and which has been pretty generally accepted by Naval architects, asserts that the resistance of water may be thus considered as consisting of three parts:—

1. Surface friction, depending upon the area of the immersed surface of the ship, and varying as the square of the speed.
2. Eddy-making resistance, which usually does not exceed ten per cent. of the frictional resistance, except in cases where the stern is badly formed.
3. Wave-making resistance.

The first element in moderate speeds and in well formed ships is by far the most important, in high speeds it is 50 to 70 per cent. of the whole and more than this when the bottom is foul. That there is a limiting point in the speed, beyond which every increase

of speed has to be paid for by an extravagantly large increase of power, because above this point the *wave-making resistance* becomes excessive, is also a generally received fact. The formula for obtaining that limit, due in the first place to Mr. Scott Russell:— $\sqrt{L} \times 1.03$, gives results in agreement with those obtained by experiments by Mr. Froude. We may add that those experiments were made in smooth water, and a further limitation of their value, as applied to the sailing performances of yachts, is to found in the fact, that vessels under sail are often heeled considerably, when their immersed after body, upon which one element of the resistance depends, is of a very different form to that of the immersed run in an upright position. As to the effect of this in increasing the eddy-making element of resistance, we have no data upon which to form an opinion, nor is much known of the effect which waves, large in proportion to the vessel, have in retarding her progress. It will, from all these considerations, be evident, that from Mr. Froude's formula $\sqrt{L} \times 1.03$ for the limit of speed at which the wave-making resistance begins to increase rapidly, to a formula for obtaining the absolute speed of a sailing vessel, is a very long jump over ground which true science would prefer to walk deliberately over step by step.

On the whole, in the present state of our knowledge of the subject, we think that if it were advisable to tax vessels for having proportions conducing to small resistance, it would be impracticable to do so with any degree of accuracy; but we think it best to confine the question to the general consideration that available sail power increases more with increase of size than does resistance, and, therefore, it is desirable to get some good measure of size.

We believe we have shown that in this measure must be included all three dimensions, because all three dimensions may be made to furnish increased power of carrying sail. Any rule which leaves out one dimension must call into existence a class of vessels having that dimension in excess, any rule which unduly taxes one dimension holds out an opportunity for evasion in respect of it. Just as we now have vessels with very small beam, so under the new rule we shall have vessels much too short. If

the new rule be adopted it can be only temporary, and will not in any respect tend to the advancement of honest yacht designing. It will certainly be a great stimulus to the yacht building trade: all vessels built to cheat the old tonnage at any sacrifice of beauty, comfort and cost, will now be obsolete and worthless, and the ingenuity of their designers will find room for exercise in a new direction. One part, at least, of the old structures will come in, the lead keels will be more pronounced than ever.

It may also be remarked that the new rule puts even a greater tax on length than the old one put upon breadth. The formula for the old rule involved the square of the breadth, but this was multiplied by the length less the breadth. The rule usually written:—

$$\frac{(L - B) \times B \times \frac{B}{2}}{92}$$

$$\frac{LB^2}{2} - \frac{B^3}{2}$$

may be written $\frac{\quad}{92}$ from which it will be seen more

readily that the inordinate importance given to the square of beam in the term in LB^2 was to some extent qualified by the subtraction of B^3 . In the new rule, the square of the length is multiplied by the breadth, and there is no similar qualification; thus, if the old rule tended to reduce beam, the new rule will have a much stronger tendency to reduce length.

An alternative rule has also, during the last few weeks been the subject of much discussion, and we propose to give a short space to considering it, because although we believe it to be in its latest development fairer than $(L^2 \times B)$ we yet think there are some strong objections to it. We refer to the girthing rule. We believe that girthing was first applied to the measurement of yachts in the case of the new Brighton Club, whose vessels were at the time mostly very small and undecked. Their rule was to multiply the girth by 1.58 and then add the length to it. There does not appear to be much in this rule, but it is to be hoped that the way in which it has been recently criticised is not to be taken as a criterion of the scientific knowledge of yachting authorities. Two writers of

standing remark in almost the same terms that it is ridiculous to convert girth into an area and then add the area to the length. We should hardly have thought that anyone with even an elementary acquaintance with geometry and mensuration would make the mistake of supposing that a fixed multiple of a linear dimension was necessarily an area.

The girthing rule, to which, however, we more particularly refer, is that of the Corinthian Club for yachts under 5 tons. It is

$$\left(\frac{\text{Girth}}{4}\right)^2 \times \frac{\text{Length}}{2}$$

One objection to this rule was that it tended to decrease freeboard unduly. To some extent freeboard is an element of sail power, but after a vessel becomes inclined beyond a moderate angle it is no longer so much a source of power as a condition of safety; and there is the further consideration that a vessel with low freeboard is a specially uncomfortable craft, and as yachts are not only built to race but to afford a means of enjoyment, it appears unwise to restrict freeboard unnecessarily. This has been generally admitted, and the rule has within the present year been modified accordingly. Whether the vessel really has more or less, she is now assumed to have, for purposes of measurement, three-quarters of an inch freeboard to every foot of her length. This amended rule is from the 1st of March to be used by the Corinthian Club for the time allowance for small yachts. The girthing rule thus modified has some considerable advantages, because it in a rough way takes in the three dimensions of the ship, but it appears to us that better results might be obtained by a more exact and equally simple application of its leading principle. The plan of taking the measure round and then assuming the square of its fourth part to be practically the area of the midship section, is open to considerable objection, because it is based upon the false assumption that the areas of such figures as the midship section of a ship vary as the squares of their perimeters. It will be readily seen that in the case of rectangles of the same perimeter, the square is the largest, and that if a rectangle differ much in proportion of length to breadth its area will be much less than that of the square with the same perimeter. The vessel whose depth and

breadth were nearly equal would gain the advantage by the girthing rule that with large beam in proportion to depth would be over-measured. There would also be some tendency in a girth rule to induce tumble home above the water-line; this objection, however, is not, we think, worth nearly as much as has been made of it. It may be further said that the necessary modifications in the girth rule have deprived it of one of its chief recommendations, its simplicity, while they leave open a chance of evasion which would doubtless be taken advantage of if it became the general rule for time allowance. We refer to the fact that the girth is to be taken amidships only. It is obvious that by means of a keel curving downwards towards the ends of the vessel, an increase of depth in the lead on the keel might be gained without affecting the tonnage.

After all that has been said, it remains the fact that the girth rule is that which has started from the true principle that a measure of size must include length, breadth, and depth, since each of these gives an increase of power to carry sail.

The actual cubic content of vessels has been used in making sailing allowances in America. The New York Yacht Club have, we believe, successively tried the displacement, the Customs Register Tonnage, and, finally, the volume of the entire hull. The objection to the latter appears to be the same as the objections to the use of the total depth as a factor in any rule, that a tax is put on freeboard. At first sight displacement appears a good measure of size, the total weight of a ship would seem to be a fair basis of tonnage. Besides the elements of length, breadth, and draught, the displacement depends upon the co-efficient of fineness. Comparing two vessels of the same principal dimension but of varying fineness, we should find that the full ship would usually have a lower metacentre than the fine one, but, on the other hand, there would in the additional displacement be furnished the means of carrying more ballast, and thus lowering the centre of gravity. Again, as regards skin-friction resistance, the full ship would be at a disadvantage on account of the larger area of her bottom. Fullness of form would generally be a disadvantage, even when it was not so marked as to abnormally increase

the eddy-making or wave-making elements of the resistance of the ship. It would therefore, we think, be unfair to tax it.

In considering what would be the best rule for yacht tonnage we conclude first that size as depending upon three dimensions is the proper object of measurement. Mr. Landseer Mackenzie, in an able letter in the *Field*, which, better than anything we have seen for some time, appears to grasp the whole question, writes his remarks:—"Tax the size, and it becomes the object of the designer to develop the greatest power the size is capable of, and thus a premium is set upon good design." It is also desirable that racing measurement should not be complicated; the whole thing is connected with pleasure and should be easily understood and easy of application. In the whole we still think the best solution of the question would be a rule depending upon the product of the length, breadth and mean draught, with some appropriate divisor which we suppose would be something over 100. The divisor should be chosen with a view to keeping the average ton of the same value as at present. We advocated this solution of the difficulty in 1874 when it began to be evident that the use of lead keels would ultimately render necessary some alteration of the tonnage rule. Something must soon be done if really good and useful yachts are not to be entirely driven out of the field by ugly devices for cheating tonnage. Let us hope that the yacht clubs will see some way to get rid of the evil without introducing a worse.

THE NEW EXAMINATION PAPERS FOR OFFICERS OF THE MERCHANT SERVICE.

IT will be seen by reference to pp. 247-252 in the March number of the *Nautical* that we have reprinted the circulars lately issued by the Board of Trade relating to alterations in the examinations for the various grades of officers in the Merchant Service. We

* *Nautical Magazine* for 1874, page 458.

cially draw attention to the fact that the new certificates of competency, introduced since March 1st, for those who elect to pass for "foreign-going steamships" do not entitle the holders of them to transfer their services to "foreign-going sailing ships;" hence it follows that the new certificates are not of equal value with the certificates of competency of the class which have been issued since 1851, which will continue to be issued to candidates who shall pass the requisite examination, and which entitle the holders to take service alike in sailing ships or steamers.

The qualifications in the examination of candidates for certificates of competency for "foreign-going steamships only" are amply specified in the circular relating thereto. But the notice of alterations in the examinations of masters and mates for the older class of certificates is more brief, being an appendix to previous circulars. It is sufficient to say that for the various grades of officers there is to be little more than a re-distribution of the problems in navigation, commencing from the 1st August, 1881.

A second mate will, in addition to the problems hitherto required for that grade, have to work those that formerly appertained to only mate.

An only mate and first mate will have to work the problems that have heretofore been required of first mate, with the addition of using the alt-azimuth problem as a time-azimuth, for which purpose they can take out the true azimuth from Burdwood's or Davis' Tables by inspection. Thus the examination papers for only mate and first mate are of the same kind.

A master will have to work the same papers as before, together with a time-azimuth by inspection.

The greatest alteration has been made in the chart questions, and these we append, with a few remarks on them.

EXAMINATION IN CHART.

The candidate will be required to work out the following questions on either a *true* or *magnetic* chart, whichever may be handed to him by the examiner; and also determine whether the chart is a true or magnetic one, and whether it is for the northern or southern, eastern or western hemisphere.

For Only and First Mate.

1. Using deviation card No. find the course to steer by compass from to ; also the distance.

Ans. Compass course.....

Distance.....

Variation

Deviation

2. With the ship's head on the above compass course, a [point] (lighthouse) bore by compass, and a [point] (lighthouse) bore by the same compass ; find the ship's position.

Ans. Latitude.....

Longitude

3. With the ship's head as above, a [point] (lighthouse) bore by compass and after continuing on the same course miles, it bore, find the position of the ship, and her distance from at the time of taking the second bearing.

Ans. Latitude

Longitude

Distance.....

For Masters.

4. Find the course to steer by compass from to (see question 1) to counteract the effect of a current which set at the rate of miles per hour, the ship making by log miles in hours, also the distance the ship would then make good in hours towards

Ans. Compass course.....

Distance.....

5. On being off by reckoning, took a cast of the lead, required the correction to be applied to the depth obtained by the lead line before comparing it with the depth marked on the chart.

Ans.

6. What do you understand those small numbers to indicate that you see placed about the chart ?

7. What do the Roman numerals indicate that are occasionally seen near the coast, and in harbours ?

8. How would you find the time of high water at any place, the Admiralty Tide Tables not being at hand, nor any other special tables available?

Questions 1, 2, 6, 7, and 8 are similar to those that have been in use in the examinations since the chart problems were first introduced, and subsequently modified.

Question 3 is a modification of the "four-point bearing" problem, well known to every practical navigator.

Question 4 is the current problem, which, in "Current Sailing," is usually given in the form of the port being in a given direction from the ship, and the ship making a given number of miles per hour by log, in a current with a certain set and drift; but the problem assumes its present form in the examination, as being more convenient for projection on the chart.

Ex. Find the course to steer by compass from A to B to counteract the effect of a current which set S.S.E. at the rate of two miles per hour, the ship making 110 miles in ten hours; also the distance the ship would then have made good in ten hours towards B.

Assuming the course of the ship to her port to be by chart S.W.; and since the current runs S.S.E. 20 miles in ten hours, the problem takes the following form, by computation:—

$110 : 20 :: \sin 6 \text{ points} : \sin 9^\circ 40'$ the change of course, which applied to S.W. in a direction *opposite* to that towards which the current is setting the ship, makes the course to steer S. $54^\circ 40'$ W.

Then, $20 \times \cos 6 \text{ points} = 7.7 \text{ m.}$, the distance due to current.

And, $110 \times \cos 9^\circ 40' = 108.4 \text{ m.}$, the distance due to change of course.

Hence $108.4 + 7.7 = 116.1 \text{ m.}$, the distance made good towards the port.

The solution by the *Traverse Tables* is as follows:—

Find the angle between the direction by chart of the ship's course towards her port and the direction of the current. Enter the *Traverse Tables* with this angle (or its supplement) as a course and the rate of the current in Dist. column; take out the corresponding D. Lat. and Dep.

Then, enter the *Traverse Tables* with the ship's run in Dist.

column and the above Dep. in Dep. column; take out the corresponding D. Lat. and the course. This course is the *angle* by which the ship's course towards her port must be corrected (*i.e.*, augmented or diminished) according to whether the current carries the ship towards, or from, her port; and the course thus corrected is the required *course to steer*.

Lastly, the sum or difference of the two D. Lats. already found, according to whether the set of the current favours, or is adverse to, the ship's progress, will be the distance the ship makes good towards her port.

Ex.—Given, ship's course by chart to her port S.W., making 110 miles in 10 hours, in a current setting S.S.E. 2 miles per hour (*i.e.*, 20 miles in 10 hours).

6 points and 20m. = 7.7 D. Lat. and 18.5 Dep.

110m. and Dep. $18.5 = 108.4$ D. Lat. and Course (angle) 94° .

Then, $45^\circ + 9\frac{1}{2}^\circ = S. 54\frac{1}{2}^\circ W.$ the required course to steer.

And $108.4 + 7.7 = 116.1$ m. the ship's rate of approach towards her port in 10 hours, the drift of the current being with the ship.

If, in the *Ex.*, the current had set N.N.W. 20 miles in 10 hours, the resolved elements would still be as above, but then

$45^\circ - 9\frac{1}{2}^\circ = S. 35\frac{1}{2}^\circ W.$ the required course to steer.

And $108.4 - 7.7 = 100.7$ m. the ship's rate of approach towards her port in 10 hours, the drift of the current being against the ship.

It would be well to practise this method by *inspection*, in order to verify the projection on the chart.

Question 5 requires the use of the Admiralty Tide Tables, and sufficient explanation of the problem will be found on pp. 98-99 of that work.

The intention of the chart questions is essentially good, but we feel bound to express surprise at the frequent repetition in the circular of the phrase "on either a *true* or *magnetic* chart." Surely all charts are geographically true north and south, and the fact of points of direction or bearing being delineated on them according to the magnetic declination at the locality does not in any sense constitute them magnetic charts. It is undoubtedly proper that a

candidate should know the difference between points projected true and magnetic, but this knowledge is merely incidental to the chart.

We may also express the hope that the time-azimuth will take the form of inducing masters and mates to practise it when at sea, and accuracy to the nearest degree be considered sufficient.

ATLANTIC DERELICTS.

 THE object of dealing with this subject is to call attention to one of the dangers of the sea, and especially of the North Atlantic Ocean, due to the large number of derelict or abandoned vessels which often drift about for a very considerable time. The number of such vessels is necessarily larger in the North Atlantic than in the other oceans, and the immense traffic greatly augments the danger due to the existence of such derelicts.

In the correspondence published at p. 144 of the *Nautical Magazine* for 1879 is the following sentence:—"It is estimated that, taking the English and Irish Channels as points of departure, no less a number than 2,500 steam vessels of full power proceed thence to the United States of America and return in like manner during every year."

When we consider the number of derelict vessels adrift at any one time and the frequency with which such vessels are sighted by other vessels, the danger due to collision must not be too lightly estimated. It is at once evident that the risk of collision is greater, the higher the speed at which a vessel is travelling, and since the transatlantic passenger steamers are now brought to such a state of perfection as regards rapidity of motion, it follows that the danger to them is one of considerable importance and a danger which, if resulting in collision, must almost of necessity lead to a very great sacrifice of life, as well as the loss of much valuable property.

The danger is probably one of even greater importance than that of icebergs, the latter being generally only met with when near the

American coast, and then usually only at a certain season of the year, when being expected a good look-out is naturally kept; but the route now adopted to America has greatly lessened the danger of collision with ice. Moreover, icebergs are usually of considerable dimensions and can generally be seen in time to avoid collision. Derelicts, on the contrary, are often waterlogged and almost flush with the surface of the water; indeed instances are given of vessels being almost wholly under water. It must necessarily increase the danger the more difficult it is for the derelict to be readily seen by the look-out.

The following list of derelicts seen in the North Atlantic, during January of the present year, has been obtained solely from notices given in *Lloyd's List*, so that although probably others existed, yet the number seems sufficiently great to warrant attention being called to the subject. In the case of a vessel being abandoned and afterwards seen afloat by passing vessels, the sighting of such derelict is given, although subsequent to January, with which month we are especially dealing, provided the vessel was known to have been a derelict in January. In the case of a vessel being passed abandoned prior to January, the earliest date only, prior to that month, is given:—

Description of Derelict.	Sighted			
	Date.	Lat. N.	Long. W.	By
<i>City of Montreal</i> , abandoned ...	Dec. 9	48°	26°	<i>Travancore</i> .
Ditto	Jan. 4	49	26	Ditto.
Barque	" 8	51	25	<i>Erin</i> .
<i>Union Flag</i>	" 10	39	55	<i>Farewell</i> .
<i>Bella Gaditana</i> , abandoned ...	" 11	45	24	<i>Prince Soltykoff</i> .
Ditto	Feb. 3	45	23	Ditto.
Ditto	" 25	42	16	<i>Ruby</i> .
Wreck bottom up	Jan. 13	45	27	<i>Singapore</i> .
Vessel about 1400 tons	" 13	50	30	<i>Massachusetts</i> .
<i>Freundschaft</i> , abandoned ...	" 15	45	35	<i>Moen</i> .
Ditto	" 20	45	36	Ditto.
— <i>hia</i> , apparently U.S. } Barque	" ?	43	37	<i>Superbo</i> .
Barque	middle			
Barque	Jan. 15	42	55	<i>Subra</i> .
<i>Ranger</i> , abandoned	" 16	36	42	<i>Peter Crerar</i> .
Ditto	" 17	35	43	Ditto.
Large Vessel nearly submerged	" 17	41	23	<i>Abercarne</i> .
Barque	" 18	50	24	<i>Samaria</i> .
American Schooner	" 19	42	51	<i>Germanic</i> .

Description of Derelict.	Sighted.			
	Date.	Lat. N.	Long. W.	By
Barque, about 400 tons ...	Jan. 21	45°	27°	Princess Louise.
John L. Tracey ...	" 23	35	68	Arcadia.
English Vessel, 200 tons, bot- tom up ...	" 24	Eng. side of Atl.		Racer.
Fanchon, abandoned ...	Dec. 9	235	21	Denmark.
Ditto ...	Jan. 20	47	36	Ditto.
Ditto ...	" 25	48	26	Matanyas.
James Edwards, abandoned ...	Nov. 28	50	20	Samaria.
Ditto ...	Jan. 19	51	18	Ditto.
Ditto ...	" 25	50	23	Braato.
Ditto ...	" 28	51	21	Amoor.
Vessel nearly submerged ...	" 26	Eng. side of Atl.		Racer.
Barque, about 700 tons ...	" 26	38	29	Vancouver.
Glasgow, abandoned ...	" 27	?	21	Carin.
Ditto ...	Feb. 3	42	18	Ditto.
Ditto ...	" 8	48	17	Osseo.
Wreck bottom up, about 90 or 100 tons ...	Jan. 27	50	25	Cahanim.
? Barque ...	" 27	51	21	Illyrian.
Fairwind, abandoned ...	" 26	47	25	European.
Ditto ...	" 29	49	25	Ditto.
Ditto ...	" 30	48	25	Express.
Sjofroken, abandoned ...	" 29	47	18	Europe.
Ditto ...	" 30	47	20	Ditto.
Ditto ...	Feb. 4	47	18	Drum park.
Ditto ...	" 8	48	16	Friedrich Perthes.
Mary Clock, abandoned ...	Jan. 30	48	25	Urania.
Ditto ...	Feb. 3	48	23	Ditto.
Ditto ...	" 4	48	23	Goschen.
Lizzie, abandoned ...	Jan. 31	45	35	Satarno.
Ditto ...	Feb. 2	45	36	Ditto.
Ditto ...	" 5	45	36	Alsatia.
Barque, about 400 tons ...	Jan. 31	49	33	Iowa.
? Les Piot ...	" ?	51	23	Somerset.
? Olstad, Barque ...	" ?	26	48	Surrey.
Barque ...	" ?	49	26	G. Broughton.

This table does not include vessels which were abandoned in January and not subsequently seen afloat, since they may have gone down quickly, and in this case they would not have proved a source of danger to passing vessels. Amongst those just referred to may be mentioned the *Exert*, *Forest Eagle*, *Pegasus*, *Mary*, *Ranger*, *Emma Francis*, and *Eliza Jane*, all of which were abandoned between January 9 and 21.

The steamship *Samaria*, in Mid-Atlantic, between January 15 and 19, passed two derelicts and took the crew off a third vessel.

The derelict which seems to have been the longest afloat of

those mentioned in table is the *James Edwards*; she was passed abandoned November 28, 1880, in 50° N. and 20° W., and 61 days afterwards she was seen by the *Amoor*, but only about 70 miles from the position where first seen. The *Fanchon* was known to have been adrift for at least 47 days, and, if the positions reported are correct, she drifted at the rate of about 30 miles a day, but there is room for considerable doubt. The *Bella Gaditana* was abandoned January 11, in 45° N. and 24° W., and was then said to be in a sinking state with 4½ feet of water in her hold, with both pumps choked; this vessel was seen by the *Ruby* on February 25 and boarded; in the 45 days she drifted about 400 miles to the E.S.E.

The weather in the Atlantic was exceptionally stormy during January and very unfavourable to homeward bound vessels, strong easterly gales prevailing throughout the month. An examination of the logs of vessels which were at sea shows that a gale blew almost every day throughout the month on some part of the track of steamers bound between England and America, and powerful steamers had to lay to for days. As most residents in England will long remember the weather of January 18, so will many a navigator long remember the stormy nature of the Atlantic in that month, and, after making due allowance for the weather, we need scarcely marvel at the number of vessels abandoned.

A similar examination was made by the writer with regard to the derelicts in the North Atlantic during the first few months of 1880, especially for the months of February and March, as the great number of abandoned vessels then afloat afforded a possible factor, however small, as to the cause of the loss of H.M.S. *Atalanta*, which vessel it will be remembered left Bermuda January 31, 1880. An instance then noticed showing the length of time that abandoned vessels will keep afloat may be interesting; the barque *Ulster*, abandoned on February 22, was sighted by several vessels until the middle of October, drifting about for eight months in Mid-Atlantic, and during this time she traversed about 2,500 miles. In the same year the derelict *Labozamus* was drifting in Mid-Atlantic, from May 14 to October 12, and was finally towed into Vigo.

Having laid the above facts before our readers, we must leave it for others to suggest remedies, if any exist, either for lessening the perhaps somewhat too common practice of abandoning vessels, or in the event of vessels being abandoned, the suggestion of methods to prevent their floating at large to the common danger of vessels carrying a living freight. If neither can be remedied we may possibly cause a better look-out to be kept for what seems to be an increasing danger.

NEW STEAMERS.

THE CUNARD ROYAL MAIL STEAMSHIP "SERVIA."

THE Cunard Royal Mail steamship *Servia* was launched on the 1st ult., from the shipbuilding yard of Messrs. James & George Thomson, Clydebank, in presence of a large number of spectators. By the launch of this vessel an important addition has been made to the Mercantile Marine of this country, and another triumph has been added to the industry for which the Clyde has become famous. The new vessel is fully 3,000 tons larger than such huge ships as the *Gallia*, the *Arizona*, the *Orient*, the *Furnessia*, and the *Parisian*, being, in point of dimensions and tonnage, only exceeded by Mr. Scott Russell's famous ship, the *Great Eastern*. Her extreme length is 530 ft., with a breadth of 52 ft., while her depth is 44 ft. 9 in. Her gross tonnage is 8,500, while the cargo capacity is equal to 6,500 tons, with 1,800 tons of coal, and 1000 tons of water ballast. The hull is built throughout of steel, has a double bottom, and is divided into nine water-tight compartments. The engines have an indicated power of 10,500 horses. There are five decks, but the principal are the upper, main, and lower. The vessel is to have three masts and two funnels, and will be barque-rigged, with pole-topmast and topgallant-mast. The saloon measures 74 ft. long, by 49 ft. wide, and here it is calculated 350 persons can easily be accommodated at meals. On the upper and lower decks there are 158 state rooms, with accommodation for 450 first-class passengers, and, when necessary, no less than 2,000 emigrants can be

comfortably carried. In accordance with the Admiralty requirements for war purposes, the *Servia* has been built with nine watertight bulkheads. To put a ship of ordinary bulk into the water requires careful preparation, especially in a narrow channel like that of the Clyde; and at such an early stage of a vessel's construction as the laying down of its keel builders have an eye to position and declivity and other things necessary to a successful launch. Accordingly Messrs. Thomson took every precaution which the resources of naval architecture afford for the launching of large vessels, and ample chain power was employed to pull up the vessel after it left the ways, while, to provide for the dip it took before it was fairly afloat, an unusually deep channel was dredged across the river. The dead weight of the vessel as it lay on the ways was 5,200 tons, and to check this enormous mass as it entered its native element six anchors and sixteen chains, possessing a restraining power of 1,500 tons, were attached to the ship in order to "pull her up." The builders were naturally anxious to get as full a tide as possible, but at fifteen minutes past one the tidal conditions were reported to be favourable, and the launch was promptly proceeded with. The supports having been knocked away, Mrs. John Burns cut a rope which freed the last of the dog-shores, and she performed the ceremony of naming the vessel the *Servia*. Slowly the *Servia* began to move, and gaining momentum the shoring timbers fell loudly, crashing and plunging in the tide, and the huge, stately vessel glided steadily and sweetly into the water. On her way across the stream the great screw blades of the *Servia* made several revolutions as if they had been propelled by steam-power and not by the sheer force of her weight and momentum, crushing them against the resisting water. Just before touching the bank at the mouth of the Cart, the strong chains at her bows pulled her safely up, and brought her back slowly towards the building yard. The launch was in every particular a complete and notable success. A number of tugs then took the *Servia* in tow, and brought her up to the large crane on Finnieston quay, which has been strengthened for the purpose of safely hoisting her heavy boilers and machinery on board.

After the launch a large party was entertained to luncheon in the model room. The chair was occupied by Mr. James R. Thomson.

The Chairman in proposing the toast of the day—"Success to the steamship *Servia*"—said: I trust it may not be out of place to allude to the reasons which led to the Cunard Company having so large a vessel built. It is well known that of late years the great competition in ocean-going passenger steamers has made it an absolute necessity to have great speed, large cargo capacity, and at least comfort, if not luxury, in accommodation. I have heard it stated by some people that the building of such great ships was a mistake, and that few such would be built in future. But I think it is very evident that where speed is required, along with large cargo and passenger accommodation, a vessel of large dimensions is necessary and will give what is required with the least proportionate first cost as well as working cost; and for this reason the Cunard Company, before it became a public company, decided to act on the proposals laid before them by Mr. John Burns, and made this immense step in advance. (Applause.) I presume some here may remember the words of Mr. John Burns on the occasion of the launch of the *Gallia* two years ago, when he stated that the Cunard Company intended to keep in the front rank, and I need hardly tell you they are doing so—(applause)—and the courageous policy of the chairman has already resulted in the construction of the *Servia* and another steel ship also of great power and size to be called the *Aurania*, with three other ships of great magnitude for cargo and passenger service. (Applause.) In asking you to drink this toast I would express the hope that the *Servia*, the first of the new type of vessel for the Cunard Company, and the others to follow, may prove as successful and as much a credit to all concerned as the many ships we have already built for them. (Applause.) I beg to couple this toast with the name of Mr. John Burns, the chairman of the Cunard Company.

The toast was responded to by repeated cheering, and

Mr. John Burns, in reply, said: I beg to thank you for the honour you have done me in coupling my name with that of the

great ship which we have seen launched to-day, and, in acknowledging the toast to which you have so kindly responded, let me say that, although all my life connected with steam navigation, this is the first occasion upon which, as chairman of an important public company, I have been called upon to answer, not only for myself, but for my colleagues and constituents; and I have a peculiar gratification in doing so at the present time, because it was exactly at this time last year that I was engaged in the work of transforming into a public company the business which, conducted for forty years, then belonged to three families. (Applause.) It then devolved upon myself and my partners to hand over with untarnished honour that business to the public—(applause)—and I venture to say that, whatever may be the fortunes of the Cunard Company in the future, there never was a commercial transaction entered upon with more scrupulous desire to do that which was right between man and man than the conversion of the Cunard Company into a great public undertaking—(applause)—and without wishing to say a word which would unwarrantably inflate the company, I can only trust that the shareholders will have reason to be satisfied with the results of the company's operations. (Applause.) I think that the sight which we have witnessed to-day will convince you that a ship of such magnitude as that of the *Servia*, involving enormous cost, and, coupled with the fact that she is the forerunner of the *Aurania*, *Catalonia*, *Pavonia*, and *Cephalonia*, now also in course of construction for the company, should not be undertaken by private individuals, but rather by a combination of individuals, such as is afforded by a large public company. (Applause.) This, then, was the principal object in my partners and myself asking the public to join us in advancing in maritime enterprise, because the time had come when great competition, and the extraordinary development of Transatlantic commerce, rendered it expedient to progress with exceptional strides, and provide vessels upon a scale hitherto practically unknown in mercantile navigation. (Applause.) The gulf between our first Atlantic steamer, the *Britannia*, and the latest addition to the fleet, the *Servia*, is marvellous, and shows probably more palpably than in

any other way the prodigious steps made in marine architecture. The *Britannia* started on her first voyage more than forty years ago. She measured 1,139 tons, and had a capacity for 225 tons of cargo, while she steamed $8\frac{1}{2}$ knots an hour, whereas the *Servia* measures 8,500 tons, will carry upwards of 3000 tons of cargo, with 2000 tons of coal, as well as 1000 passengers, and maintain a speed, I hope, of not less than $17\frac{1}{2}$ knots an hour, or more than double that of the *Britannia*. (Hear, hear.) This shows at a glance the vast changes which have taken place in steam navigation, and I believe that we are upon the threshold of still greater achievements. (Hear, hear.) I am emboldened to say this from what I see in the development of new materials and scientific inventions. We have in the *Servia* a notable instance of how, as iron superseded wood, steel is superseding iron. I well remember the careful calculations into which I went with Mr. James Thomson, the designer as well as the constructor of the *Servia*—(applause)—in regard to the advantages of steel, and also the crucial investigation by scientific experiment of the article itself, before I recommended its adoption to my partners, and the facts then elucidated were so favourable to steel as against iron that we did not hesitate to accept it, not only because of its greater strength, but that united with superior ductility we gained the advantage of less weight, as will be seen, when I mention that the *Servia*, if built of iron, would have weighed 620 tons more than she does of steel, and would have entailed the drawback of a corresponding increase in draft of water. (Hear, hear.) In regard to scientific discoveries and inventions, I would say, if I may express it in the presence of so many scientific men as I see around me, that science is, if anything, tending to tread too hastily upon the heels of commerce—(hear, hear)—for there is no portion of a ship, from stem to stern, from truck to keel, which is not subject to suggested improvement by scientific men; and I can assure you that it requires all the proverbial blandness of a chairman to decline the overtures of hosts of suitors who come to ask his favour in adopting their varied wares. (Applause and laughter.) Still, without doubt, there are looming in the future some scientific discoveries which, I believe, will come to play

a most important part in navigation; and I think we may assume as more than probable that electricity will yet form a powerful factor in the economy of mechanical locomotion. (Applause.) In the meantime the duty of those who conduct great maritime enterprises is to keep their eyes open to every improvement which will conduce to safety and comfort, conducting their business upon the lines of a liberal and enlightened policy, and which, I am convinced, is the best means of producing results alike satisfactory to the general public and to those who invest their money in maritime adventure. (Applause.) It has given me exceptional pleasure, as it has done to my brother directors around the table, to receive a telegram from one of our great rivals—and a most generous rival, too—a man who, I am proud to say, is my friend, and whose friendship I hope always to maintain—Mr. Ismay, of the White Star Line. The telegram says: "Success to the *Servia*. Accept congratulations on last Cunarder. May her performance long add to the well-deserved reputation of your company." (Applause.) I feel that these are the lines on which generous rivalry should be conducted, and that good friendship should be maintained all round. (Applause.)

Lord Ravensworth proposed "The Health of Messrs. James and George Thomson."

The Chairman, in returning thanks, stated that the first vessel they built for the Cunard Company measured 128 feet long, 20 feet beam, and 10 feet deep, with a gross tonnage of 175 tons. (Laughter.) He was proud to say that steamer was still working, and likely to work for a long time. (Applause.) The *Servia* was a slight increase on that; but he assured them they found it just as easy, and there was as little trouble and anxiety to launch her as the vessel he had referred to. It was invidious to compare the *Servia* with vessels of any other form; yet he thought they might go too far in that direction, looking at the commercial results. After careful calculations they had, therefore, advised the Cunard Company to build the *Servia* upon the lines which they formerly followed.

THE ALLAN LINE NEW STEAMSHIP "PARISIAN."

Messrs. Allan Brothers and Company's fleet of ocean steamships, of which the steel-built *Parisian* is the latest specimen, consists of some twenty-four vessels, the first of which, one of 1,500 tons, was built twenty-eight years ago, up to which time only sailing ships had been employed. It is sixty years since the line was established, and the total tonnage now owned by the firm amounts to close upon 100,000 tons.

The use of steel in the construction of steamships in place of iron is a change of vast importance and forms a subject of wide interest; and as the *Parisian* is, next to the *Servia*, the largest steel steamer which has yet been built, and as she is, moreover, in regard to construction and structural arrangements thoroughly abreast of the latest achievements of naval architecture, she demands careful attention. The general dimensions of the vessel (which was designed by Mr. Wallace, the company's superintendent engineer) are as follow:—Length over all, 450 ft.; breadth, 46 ft.; depth (moulded), 36 ft., with a gross tonnage of about 5,500 tons, and a load displacement of about 10,000 tons. The machinery, upon which have been expended immense skill and industry to utilise all the latest results of engineering science, consist of a massive set of compound engines of the three-cylinder type capable of developing 6,200 indicated horse-power, which will propel the ship at a speed of from 15 to 16 knots per hour. Four double-ended tubular boilers, with 24 furnaces supply the steam. For the purpose of obtaining the maximum of strength, the hull has been built of steel, made by the Steel Company of Scotland, and the bottom has been constructed upon the longitudinal bracket-framed system, with an outer and inner skin five feet apart; this space is also subdivided into numerous watertight compartments, and, while available for water ballast, is principally valuable in reducing danger should the outer skin be damaged, while ten watertight bulkheads afford protection against the perils arising from collision. The owners of the *Parisian*, mindful of the great importance which has recently come to be attached by Government to the adaptability of vessels of this description to transport or cruising purposes, have constructed the ship so that she may be available

in time of war for either of these services; and we understand she has been surveyed by the Admiralty officials with this view. Ten water-tight bulkheads have been fitted, and the engine and boiler casings and coal bunkers have been made watertight. These structural arrangements more than fulfil the Admiralty requirements; and as the *Parisian* will be able to carry sufficient coal to enable her to reach the most distant colony without stoppage, she would in the event of war prove a valuable auxiliary to our fleet. With the double bottom filled with water ballast, she would have sufficient stability to enable her to carry half-a-dozen guns of moderate size and weight, and would therefore be available as an armed cruiser. The steamer is rigged with four masts, and these, with her two funnels and symmetrical outline, give her an appearance in the water which satisfies the desire of the eye for effect, while a closer inspection of her deck also gives the spectator an impression of cosiness and snugness. The state-rooms, of which there are sufficient for 150 first-class passengers, are luxuriously-furnished apartments. The saloon is placed before the machinery space, where there is the least vibration, and it occupies the full width of the vessel. The fittings and decorations of the apartment, the artistic beauty and elegance of which is exceedingly pleasing. The sideboard, glass cupboard, and bookcases are made of walnut, with richly carved doors in front, and bevelled glass mirrors above, while the whole floor has been covered with oak parquetry, upon which are crimson Persian carpet runners. The dining chairs are of a unique and elegant design, with spindle backs to match the general character of the decorations, and a novelty has been introduced by making the seats to slide diagonally instead of revolving, as usual. They are covered with crimson velvet, finished with brass studs. Lamps of an elegant design have been placed upon the dining tables, and have been specially made for burning mineral oil. Four handsomely carved walnut doors, with portier curtains of rich Persian tapestry, lead to the stateroom passages, which run before and abaft the saloon. At the after-end of the saloon is the ladies boudoir, very tastefully fitted up. Upon the opposite side is the pantry, which has been fitted up with the most modern appliances. A wide and handsome staircase, with

teak-carved balustrades and indiarubber treads, leads from the saloon doors to the promenade deck, where the music room is situated. This room is another triumph of tasteful decoration, and for the passengers who are fortunate enough to travel by the *Parisian* will constitute an elegant and cheerful retreat, in which they may enjoy the solace of music, while also securing ease for the body and gratification for the eye. A Broadwood piano, in a specially designed case, is provided, and harmonises with the richly panelled and carved doors. The smoke-room, which is placed on the deck aft, is furnished in the same style, the walls being panelled with muralis work in blue and gold, while the sofa cushions are covered with olive morocco. The muralis work referred to is somewhat of a novelty in steamship decoration, but its effect is undeniably rich and pleasing, and it has also the merit of durability. On the promenade deck is placed the galley, with its cooking ranges, baker's ovens, grills, steam cooking pans, &c., with their numerous appliances for meeting the gastronomic requirements of the crew and passengers; while on the main-deck forward has been fitted up a very commodious and complete post-office, with all the requisite conveniences for the use of the resident postmaster. Respecting the quarters for the steerage passengers, for whom there is accommodation for about 1,150, the owners and builders have been equally solicitous to secure all possible comfort, and to obviate as far as can be done the inconveniences which are inseparable from a voyage across the Atlantic. The berths for females and children are provided in exceedingly commodious, well-lighted, and healthy apartments. The rooms, which are unusually lofty, well-lighted, and ventilated, have water-tight doors affixed to them, which can be closed in case of collision or other injury, and thus prevent the water reaching them. There is also accomodation provided for thirty-six intermediate passengers, and those who choose this class of passage will have no cause to grumble at their quarters, which are of an exceptionally comfortable and convenient character. It may here be stated that in each of the state-rooms the pillow with which the bed of the inmate is supplied constitutes, in case of danger, an effective life-saving apparatus. This

pillow, which has been invented and patented by Mr. Woods, superintendent of the victualling department, is made of the hair of the moose, and is so constructed that in the hour of danger the passenger could immediately fasten it around his body in a way which would make his sinking impossible. The pillow consists of two parts, one to cover the chest and the other the back, and the two portions can be readily fastened by the passenger himself. Once secured to the body, it cannot be removed by the pressure of the water; the end of the pillow supports the chin, and therefore keeps the man's head above water; while the whole contrivance will act as a protection against injury from floating wreck. The steerage passengers are all supplied with the pillows at a very moderate cost, and, thus fortified against danger, there would in the event of anything serious happening, be no tendency on their part to indulge in the panic which so often breaks out on such occasions. A unique feature in the arrangements of the vessel is the placing of the crew's quarters at the stern, an innovation upon established custom which is not a subject of unmixed satisfaction to "Jack," who, as was humourously remarked, cannot conceive how a fore-castle can be at the stern of the vessel. The captain has two cabins—one at the saloon staircase, and the other upon the promenade deck, just abaft the steering-house and bridge—so that the officer on the watch can call him at once. The other officers—engineers, doctor, purser, stewards, petty officers, &c.—have comfortable quarters, and have evidently been a cause of special consideration to the owners. The efficient working of the ship and the rapid handling of cargo have also had careful attention, the vessel being provided with Napier's steam windlass and screw-steering gear, Muir and Caldwell's steam-steering gear, Taylor's improved steam winches, Chadburn's steering and engine-room telegraphs, Sir Wm. Thomson's compasses and sounding machine, Hocking's patent water filters, &c.

NOTES FROM CONSULAR REPORTS.

BULGARIA.

Roustchouk.—Some little interest attaches to the trade of this port in connection with certain questions which are to be debated in the newly-formed Bulgarian Chambers in reference to the formation of free ports and the alteration of tariffs. A strong party is in favour of making Roustchouk a free port; this would certainly be advantageous to Austrian trade, and possibly injurious to British trade. If, on the other hand, Varna, through which the greatest portion of the commerce appears to flow, is made free, trade from European Western ports would be benefited. Looking over the tables given of exports and imports, it is difficult to discern what are the staples of and what are the chief things saleable in the country. Trade has suffered very much in consequence of the war, but the promising crops of 1880 have encouraged the hope that the Bulgarian nation may be enabled to recommence as one of the grain-exporting countries of the world, with the natural consequence of an increased importation of European goods.

GREECE.

Cephalonia.—The Vice-Consul remarks, in reference to the trade of Cephalonia, that its geographical position and limited resources preclude the possibility of any further development of its commerce with foreign countries. There seems to have been a falling off in the number of vessels visiting the island in 1879 as compared with previous years; 29 British vessels arrived and sailed, which is by far the largest number among foreign visitors. Small Greek sailing vessels do most of the carrying trade. Coals appear to be the only article imported direct from our country, but British goods find their way in small quantities to the island, conveyed *via* Corfu and Zante by the mail steamers of the Austro-Hungarian Lloyd's. Currants constitute the chief export, and the return for 1879 is by no means unfavourable, although it is not so good as that for 1878, when there was a specially abundant crop.

The manufacture of wine on the island is developing, and

the Cephalonia wines of Mr. E. A. Toole's establishment, principally his "Rombola," "dry Corinth," and "sweet Muscat," have been so favourably received that there is a probability of the exportation of wine forming an important feature in the trade of the island. Olive oil is a product of the island, but, unless there is a large yield, oil is not exported, but kept to supply the home consumption.

Corfu.—The trade of this island for 1879 shows a marked increase in the value of imports and exports over that of the preceding year. The increase in the exports was owing to the good oil season, and in consequence the imports increased, on account of the population indulging in foreign luxuries.

The produce of the island is principally olive oil, the market for which is subject to considerable fluctuations. Of late years the crop has been a biennial one, owing to an improvement in the climate. The last crop yielded 13,968 tons, of which 10,793 were shipped to foreign ports. There is also a small export of soap and bricks, the manufacture of which gives employment to a number of people on the island. The import of coals for 1879 amounted to 11,099 tons, and a large quantity of wheat and maize found a ready market.

The commerce of the Ionian Islands has, during the past twelve months, been unfavourably affected by the state of Epirus. From the uncertainty as to what would take place respecting the frontier question, commerce has been almost at a standstill.

Patras.—Currants are the chief produce of this district, the total value of the crop for 1880 being valued at £1,620,000. Other articles of export are olive oil, grain, cocoons, wine, figs, valonea, lambskins, tobacco, &c., and in the transport of these articles it appears that British ships shared largely.

The import trade with England was fairly active during 1880, notwithstanding the heavy dues exacted. Sugar, iron, coals, petroleum, are some of the chief imports, and in 1880 a large quantity of codfish, the consumption of which is annually increasing. During the season the rates of freight were low on account of the large number of steamers calling at the port in search of employment. The Consul states that many fine, large

sailing vessels have been built in the vicinity, which now trade to all parts of the world. It is also announced that several English steamers and sailing vessels loaded currants in barrels, bags and in bulk for Marseilles, Cette and Rouen. It is this sort of thing, however, which the French bounties have been devised to check.

A French Company is carrying out some new harbour works at Patras.

Santa Maura.—The exports from this port in 1878 and 1879 were olive oil, wine and currants—the staple products of the island—linseed, salt, tobacco leaf, spirits of wine, wool, sheepskins, citrons and valonea. The countries to which these products were shipped, whether directly or indirectly, were—to England, olive oil and currants; to Trieste, oil, currants, valonea, wine, sheepskins and spirits; to Russia, olive oil; to Italy, wine, oil, currants and linseed; to France, wine and currants.

The principal imports were wheat, flour, barley, maize, butter, cheese, rice, beans, potatoes, sulphur, colonial produce, dry fish, drugs, petroleum, tobacco, hardware, earthenware, iron, copper, steel, calicoes, cotton twist, prints, &c. The bulk of the manufactured articles arrive from Austria and Germany direct, and the largest proportion of the carrying trade is in the hands of the Greek Navigation Company and the Austrian Lloyd's. It is very seldom that a British vessel visits the port, but this is apparently owing to the absence of direct communication, the superiority of British goods for quality and durability being generally acknowledged.

Zante.—Currants, olive oil and soap are the only exports of any importance from this island. In 1879 the total value of the exports amounted to £141,166. There seems to be a fair market for foreign goods, although the imports for 1879 show a falling off in value as compared with previous years. The import duties are said to be disproportionately heavy and a good deal of smuggling goes on, two influences prejudicial to the extension of trade. Greek and Austrian vessels appear to have the principal proportion of the carrying trade, comparatively few British vessels calling at the island.

CORRESPONDENCE.

ON SUMNER'S METHOD.

To the Editor of the "Nautical Magazine."

SIR,—In computing the latitude and longitude by Sumner's method, it appears to me that a good many figures may be saved by not working out to their respective longitudes the four hour angles obtained from, for instance, nearly simultaneous alts. of two stars, but by using instead the mer. dists. themselves, in time, in order to find the correction for longitude, in the same way as they are used in the verification of the latitude problem as given in the epitomes. The saving is that, instead of having to apply the star's R.A., the mean sun's R.A., and the G.M.T. to all four hour angles and to turn them all into $^{\circ} ' ''$, it has only to be done once. In this way the lat. and long. are found, I think, with fewer figures even than by projection on the chart.

In explanation of my meaning, if the two H.A. for lesser lat. be called a and b respectively, and the two H.A. for greater lat. c and d , take the difference between a and b , calling it "*diff. for less lat.*," and take the difference between c and d , calling it "*diff. for greater lat.*"

Find the difference between *diff. for less lat.* and *diff. for greater lat.*, calling it "*Diff. A.*"

Find the difference between the two R.A. of stars, and take the difference between that difference and the "*diff. for less lat.*," calling it "*Diff. B.*"

Then the proportion is—*Diff. A* : *Diff. B.* :: $a \sim c$: To the correction, in time, to be applied to hour angle a or c , as the case may be. It is unnecessary to particularise here which way the correction is to be applied; what I have said will no doubt suggest to you my meaning.

This plan is not mentioned in any navigation book that I have seen, and from that I should have supposed that there is some objection to it, as it must have been tried. Certainly, by converting the time into arc, the correction can be taken to a second of arc, instead of to a second of time, but in practice that is not much advantage. My reason for mentioning its applicability to

stars, simultaneous alts. rather than to two alts. of sun is merely that, of course, having taken one alt. of sun, one wishes to make some use of it at once instead of waiting. As an amateur who has read with great interest your recent articles on intersectional navigation, and practised it during a great part of last year, I shall be glad to be put right if I am wrong, provided that you consider the matter worth noticing in the *Nautical Magazine*.

Yours, &c., FRED. C. GREEN.

[The termination of Sumner's method *by proportion*, being merely an arithmetical calculation, may, as our correspondent infers, be worked out from the hour angles as well as from the longitudes; it is a matter of choice. In works on navigation a rule is usually given in its general form, and the rest left to the intelligence of the navigator. We may also note that, if two stars are simultaneously observed when in a good position for finding time and giving a good crossing of the lines of position, it is generally sufficient to work out, by the D.R. latitude, the longitudes corresponding to each star; mark the two places on the chart; then find, by *inspection* from the Time Azimuth Tables the azimuth of each star; and lastly, the projection of two lines of position at right angles to the azimuths and passing through the two assumed positions of the ship will give, at the crossing point, the true position.—ED. N. M.]

BOOKS RECEIVED.

The Newcastle Nautical Almanac, Directory, and Guide to the Port of Newcastle, N.S.W., for the year 1881, &c., &c. Newcastle, N.S.W.: R. C. Knaggs and Co.

THE enterprising publishers of this Almanac, a work of which we have had occasion to speak highly in previous years, still continue to give the latest information up to the date of issue from the press. Old matter of a valuable kind is retained in it from year to year, and to this is superadded all the changes of latest occurrence. It is at once a directory to the dwellers in New South Wales, and to those who frequent the harbour of Newcastle. But the nautical information is not confined to that port; it embraces

other ports of Australia, with particular instructions on the routes to China. The work is a perfect repository of knowledge useful alike to landsmen and seamen.

L'Année Maritime, revue des événements qui se sont accomplis dans les Marines française et étrangères, &c., &c. Paris: Challamel aîné. 1880.

THE number of works under the various titles of *Année*, *Annuaire*, *Guide*, *Carnot*, and *Almanach* (for everybody and for everything) that are produced in France is enormous: they must find readers and subscribers, else they would not be issued for years in succession. We have nothing like them. They must keep the community in general well posted up in all subjects. If the matter is not very abstruse, it is generally pleasant reading, and affords something to talk about. The work before us begins by narrating the history of the war between Chili and Peru, from official sources, and we have all the particulars of the land and sea fights to the close of 1879: then come general politics and the subject of international law. Next we have a chapter of budgets, naval and military, followed by the distribution of officers and men in each service. Another chapter is devoted to the naval armaments of different nations, taking account of naval construction and marine artillery, not forgetting torpedoes. Under the head of navigation we meet with most of the inventions produced, and patents taken out, within the year. And the conclusion is devoted to statistics of commerce and the Mercantile Marine. The information is generally sound on the subjects mentioned, and the *Année* is in reality an *aide memoire* on maritime things in general, not only French, but European, and takes a survey "from China to Peru."

The Ship of the Future for the Inter-Oceanic Route. By R. B. Forbes, Boston, U.S.

THIS pamphlet is occupied firstly in a discussion of the prospects of the proposed Panama Canal, and secondly by proposals as to vessels likely to be suitable for trade through it, and for other long ocean voyages. Sailing ships, it is urged, cannot use the canal without great expenses for towage, &c., which would take up any saving. From the fact that the trade from California to

New York by the Isthmus has fallen off from seventy millions of dollars in 1869 to five millions in 1878, it is also argued that the trans-continental railways, which have now superseded the Panama route, will ultimately obtain the whole Californian trade. It is also Mr. Forbes' opinion that the present Panama route with expenses of discharge and re-shipment at each end will, on the whole, be less costly than a ship canal. The experience of the Suez Canal proves that sailing vessels cannot profitably use it. There would, it is true, be less narrow sea navigation in the case of the Panama Canal. As to the railways engrossing the Californian trade, it may, we think, be safely laid down that sea routes can always compete successfully with railways, even when the distance traversed is two or three times as great. The disadvantage of discharge, short land transit, and re-shipment is, however, immense, and for all these reasons the Panama Canal has a prospect of as fair a success as the Suez Canal has achieved. The ship of the future is a large vessel with auxiliary engines capable of propelling her at five to six knots, but only to be used in calms. Two new kinds of rig are proposed, either of which would secure the advantage of being worked with a very small crew, and to economise still farther the engineers and firemen must be also seamen. Mr. Forbes appears to think that the greatest drawback of sailing ships with auxiliary engines in the past has been the drag of the propeller, and he proposes to have a donkey engine just powerful enough to turn it, and also to work the sails, &c. Auxiliary engines have been tried, and have signally failed in the past from more important causes than that thus indicated. It does not pay to put one engine in a ship and carry it about with a lot of coals on the chance of both being required, and, further, it is more expensive to drive a vessel at very low than at moderate speeds. There is, in fact, for every steamer a speed of least expense, depending upon her form and size.

The new rigs for vessels of which sketches are given, are of very ingenious design, and we should think that, in the present day, when expenses of working ships have to be cut down in every practicable way, they would be found applicable in some cases.

Annual Report of the Lighthouse Board to the Secretary of the Treasury, for the fiscal year ending June, 1880. Washington.

FROM this, the last annual report of the United States Lighthouse Board, which is as voluminous and as well illustrated as usual, we learn that there were established up to June 30, 1880, a total of 630 coast, harbour and lake lighthouses with lights ranging from the sixth order; 819 stake-lights on rivers, of which the Mississippi, Missouri and Ohio absorb 777; the lightships numbered 31; there were 25 whistling buoys in position; 3,115 other buoys in position; and 57 fog-signals (steam or hot-air). During the year, 26 new lights were exhibited, 8 lights were discontinued, and the characteristics of 12 lights were altered. The amount estimated to be needed for the general service of the lighthouse establishment during the fiscal year is 2,480,925 dols., which is a considerable decrease on the previous grant, the Board having confined itself to providing for the maintenance of the existing establishment and to finishing of works already authorized. Mineral oil has been substituted for lard oil in all lights of the fourth, fifth and sixth orders, with a marked increase in their brilliancy, and with a decrease of cost. The work of rebuilding Cape Henry lighthouse is fairly under way, and it will probably be completed during the present fiscal year. Little remains to be done to complete the system of coast lights. One first order light should be placed on Cape Fear, N. Carolina; and whether it should be built on the land or on the Frying Pan shoals off Cape Fear, will be determined by examination. A third order light on Sanabel island, Florida, is in contemplation; and it may also be necessary to construct two or three first order lights on the Pacific coast, notably one on Point Sur, south of the harbour of San Francisco, and one at or near Point Saint George, to the northward. The increase of commerce makes a corresponding increase in the power of certain lights necessary; this will receive attention. The same progress justifies the establishment of harbour lights and the buoyage of channels. The appendix, as in last year's report, relates to experiments in electric lighting.

TIDE TABLES FOR APRIL, 1881.
Also Ports of Reference for the Constants in the next Table.

WEEK DAY	MOON DAY	LONDON BRIDGE.		HULL.		NORTH SHIELDS.		LEITH.		DEVON- PORT.		DOVER.		WESTON SUPER- MARE.		LIVER- POOL.		GREEN- OCK.		QUEEN- TOWN.		KINGS- TOWN.		LONDON- DERRY.		BREST.		
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
P	1	3 16	8 34	7 48	8 46	4 40	4 59	8 35	8 35	7 1	7 18	0 16	0 96	8 13	8 22	0 90	0 90	1 0	1 28	6 20	0 98	0 6	0 27	9 13	9 30	6 8	5 21	
S	2	3 52	4 11	8 24	8 42	5 18	5 57	4 12	4 31	7 34	7 49	0 56	1 15	8 46	9 8	0 97	1 14	1 47	2 6	6 56	7 14	0 46	1 5	9 47	10 5	8 37	5 55	
S	3	4 20	4 46	9 1	9 20	5 56	6 12	4 50	5 9	8 5	8 21	1 36	1 55	9 20	9 37	1 33	1 50	2 28	2 41	7 23	7 50	1 24	1 44	10 23	10 42	6 14	4 38	
M	4	5 4	5 22	9 59	9 59	6 35	6 56	5 20	5 51	8 57	8 54	2 15	2 33	9 53	10 5	2 8	2 28	2 59	3 18	8 9	8 25	2 25	2 4	2 23	11 4	11 31	6 53	7 14
W	5	5 42	6 4	10 20	10 44	7 18	7 43	6 14	6 56	9 12	9 32	2 55	3 10	10 26	10 45	2 48	3 10	3 37	3 58	8 48	9 10	2 47	3 10	—	—	7 37	8 1	
W	6	6 26	6 53	11 19	11 45	8 11	8 43	7 6	7 37	9 54	10 20	3 39	4 4	11 10	11 40	3 35	4 8	4 23	4 49	9 35	10 5	3 26	4 6	0 36	1 14	8 59	10 1	
F	7	7 20	7 53	12 1	12 27	9 20	10 1	8 15	8 55	10 51	11 31	4 30	5 6	—	0 18	4 37	5 19	5 20	5 57	10 41	11 21	4 41	5 21	1 56	2 39	9 50	10 1	
F	8	8 31	9 10	1 6	1 38	10 42	11 19	9 37	10 13	—	0 13	5 41	6 16	0 56	1 35	6 2	6 48	6 56	7 15	—	0 1	5 58	6 34	8 19	5 54	11 0	11 38	
S	9	9 57	10 36	2 14	2 45	11 53	—	10 46	11 18	1 38	6 51	7 26	7 51	2 12	2 48	7 20	7 54	7 53	8 25	0 88	1 13	7 8	7 40	4 23	4 50	—	0 13	
M	10	11 8	11 40	3 20	3 49	0 24	0 53	11 47	—	2 10	2 42	7 59	8 28	3 22	3 53	8 25	8 51	8 50	9 25	1 45	2 15	8 9	8 35	5 14	5 35	0 44	1 12	
M	11	—	0 48	4 16	4 39	1 17	1 39	0 18	0 34	3 11	3 35	9 15	9 42	4 22	4 48	9 12	9 32	9 49	10 11	2 41	3 8	9 1	9 24	5 53	6 11	1 36	1 56	
W	12	0 28	0 48	5 58	6 15	1 58	2 15	0 52	1 10	3 50	4 21	9 32	9 51	5 11	5 31	9 40	10 10	10 49	11 23	3 22	3 41	9 43	10 0	6 29	6 47	2 14	2 31	
W	13	1 6	1 24	6 32	6 49	2 31	2 47	1 27	1 44	4 42	5 1	10 10	10 29	5 51	6 11	10 22	10 40	11 11	11 27	4 0	4 19	10 16	10 32	7 6	7 23	3 48	3 6	
W	14	1 42	2 0	6 7	6 26	3 4	3 21	2 1	2 18	5 20	5 39	10 49	11 9	6 31	6 51	10 58	11 17	11 46	—	4 38	4 57	10 49	11 6	7 41	7 59	3 24	3 49	
F	15	2 16	2 34	6 45	7 4	4 38	3 56	2 35	2 58	5 57	6 15	11 29	11 40	7 11	7 30	11 36	11 55	0 5	0 24	5 16	5 36	11 24	11 43	8 16	8 33	4 1	4 26	
F	16	2 50	3 10	7 28	7 42	4 15	4 35	3 11	3 30	6 34	6 53	—	0 10	7 49	8 8	—	0 15	0 43	1 8	5 56	6 16	—	0 3	8 51	9 9	4 39	4 58	
S	17	3 29	3 48	8 2	8 22	4 55	5 16	3 49	4 9	7 11	7 29	0 32	0 54	8 27	8 47	0 35	0 53	1 23	1 44	6 36	6 57	0 28	0 44	9 28	9 45	5 18	5 38	
M	18	4 10	4 30	8 48	9 5	5 37	6 0	4 31	4 54	7 51	8 13	1 17	1 40	9 7	9 28	1 15	1 36	2 5	2 27	7 19	7 42	1 6	1 29	10 9	10 32	6 0	6 23	
M	19	4 52	5 13	9 28	9 53	6 24	6 49	5 18	5 45	8 35	8 57	2 4	2 29	9 40	10 10	1 59	2 33	3 49	3 13	8 5	8 29	1 53	2 19	10 59	11 30	6 47	7 14	
W	20	5 37	6 10	10 51	10 51	7 17	7 42	6 14	6 45	9 22	9 51	3 55	3 29	10 32	10 58	2 48	3 16	3 37	4 6	9 55	9 23	2 47	3 17	—	0 7	7 48	8 18	
W	21	6 35	7 6	11 27	11 27	8 25	9 2	7 10	7 57	10 22	10 56	5 31	4 23	11 29	—	3 48	4 24	4 35	5 8	9 54	10 23	3 50	4 28	0 50	1 37	8 48	9 26	
F	22	7 42	8 20	0 8	0 48	9 47	10 23	8 39	9 21	11 34	—	4 56	5 30	0 4	0 43	5 6	5 47	5 44	6 24	11 9	11 40	5 47	6 24	2 24	3 48	6 10	6 49	
F	23	9 1	9 44	1 27	2 4	11 8	11 42	10 30	10 30	0 17	1 1	6 6	6 30	1 24	2 4	6 31	7 13	7 4	7 4	0 29	6 24	7 0	3 43	4 16	11 31	—	—	
S	24	10 23	10 58	2 39	3 12	—	0 19	11 12	11 40	1 42	2 18	7 21	7 54	2 43	3 18	7 48	8 18	8 19	8 51	1 6	1 41	7 33	8 3	4 43	5 8	0 8	0 40	
M	25	11 29	11 58	3 48	4 12	0 47	1 12	—	0 6	2 50	3 19	8 24	8 50	3 52	4 24	8 46	9 11	9 21	9 48	2 12	2 40	8 33	8 1	5 31	5 54	1 8	1 34	
M	26	—	0 22	4 38	5 0	1 37	1 59	0 30	0 62	3 46	4 11	9 35	9 53	4 53	5 19	9 33	9 54	10 13	10 36	3 6	3 30	9 26	9 49	6 16	6 37	1 57	2 19	
W	27	0 48	1 10	5 21	5 42	2 20	2 40	1 14	1 36	4 35	4 57	10 2	10 24	5 36	6 10	10 50	11 30	11 59	11 22	3 63	4 15	10 28	6 57	7 17	2 40	3 8	3 42	
W	28	1 34	1 55	6 2	6 24	3 0	3 19	1 57	2 17	5 18	5 38	10 46	11 6	6 30	6 51	10 50	11 26	11 41	4 4	4 30	4 57	10 27	11 44	8 16	8 34	4 1	4 29	
F	29	2 13	2 33	6 45	7 5	3 38	3 57	2 36	2 54	6 38	6 58	11 30	11 51	7 11	7 30	11 39	11 56	0 5	0 23	5 17	5 37	11 25	11 44	8 16	8 34	4 1	4 29	
F	30	2 51	3 10	7 24	7 43	4 16	4 35	3 12	3 30	6 36	6 53	—	—	7 48	8 7	—	0 13	0 45	1 4	5 56	6 13	—	0 3	8 51	9 8	4 39	4 57	

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

By applying the Tidal Constant of the place, according to its sign (+ or - sub.), to the time of high water on the given day at the port of reference, have the time of high water at the place sought.

PLACE.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
	H. M.			H. M.	
Aberdeen	-1 17	Leith	Jersey (St. Helier)	+2 38	Brest
Aberystwyth	-3 52	Liverpool	Kinsale	-0 18	Queenstown
Alderney	+2 59	Brest	Lerwick (Shetland) ..	-3 47	Leith
Antwerp	+5 13	Dover	Limerick	+1 15	Queenstown
Arbroath	-0 42	Leith	Lisbon bar	-1 17	Brest
Arachon	+0 50	Brest	Littlehampton	+0 24	Dover
Arklow	-2 25	Kingstown	Llanelli bar	-0 38	Weston-s-M
Ayr	-0 18	Greenock	Lowestoft	-1 1	London
Banff	-1 49	Leith	Lynn & Boston Deep ..	-0 29	Hull
Bantry harbour	-1 14	Queenstown	Margate	-2 18	London
Barnstable bridge	-0 26	Weston-s-Mare	Maryport	+0 3	Liverpool
Bayonne	-0 2	Brest	Milford Haven entr. ..	-0 53	Weston-s-M
Beauly head & Eye bay	+0 8	Dover	Montrose	-0 52	Leith
Beaumaris	-0 51	Liverpool	Morlaix	+1 6	Brest
Belfast	+2 42	Londonderry	Needles point	-1 26	Dover
Berwick	-1 5	N. Shields	Newcastle	+0 23	N. Shields
Blyth	-0 8	N. Shields	Newhaven	+0 39	Dover
Bordeaux	+3 3	Brest	Newport	+0 16	Weston-s-M
Boulogne	+0 13	Dover	Nieuport	+1 6	Dover
Bridport	+0 22	Devonport	Nore	-1 28	London
Bristol & King Road ..	+0 19	Weston-s-Mare	Orfordness	-2 43	London
Cadiz	-2 2	Brest	Oporto	-1 17	Brest
Caernarvon	-1 56	Liverpool	Ostende	+1 13	Dover
Calais	+0 37	Dover	Padstow	-1 41	Weston-s-M
Campbellton	-0 23	Greenock	Peel, Isle of Man	-0 15	Liverpool
Cardiff	+0 2	Weston-s-Mare	Pembroke Dock	-0 43	Weston-s-M
Cardigan bar	-4 22	Liverpool	Penzance	-1 13	Devonport
Carlingford bar	-0 10	Kingstown	Peterhead	-1 43	Leith
Chatham	-0 47	London	Piel harbour, Barrow ..	-0 18	Liverpool
Cherbourg	+4 2	Brest	Plymouth breakwater ..	-0 6	Devonport
Coleraine	-1 37	Londonderry	Pools	-2 2	Dover
Coquet Road	-0 23	N. Shields	Port Carlisle	+0 47	Liverpool
Cordouan Tower	-0 10	Brest	Portland breakwater ..	+1 18	Devonport
Cowes (West)	-0 27	Dover	Port Patrick	-0 58	Greenock
Crinan	+4 41	Greenock	Portsmouth	+0 29	Dover
Cromarty	-2 21	Leith	Ramsgate	-2 19	London
Dartmouth	+0 33	Devonport	Rotterdam	+4 33	Dover
Deal & Downs	+0 3	Dover	Santander	-0 17	Brest
Dieppe	+7 19	Brest	Scarborough	+0 48	N. Shields
Donaghadee	+0 3	Kingstown	Selsea bill	+0 33	Dover
Donegal harbour	+0 17	Queenstown	Sheerness	-1 21	London
Douglas & Ramsay	-0 11	Liverpool	Shoreham	+0 22	Dover
Dublin bar	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
Dundalk	-0 16	Kingstown	Southampton	-0 42	Dover
Dungess	-0 27	Dover	Spurn point	-1 3	Hull
Dunkerque	+0 56	Dover	St. Ives	-2 10	Weston-s-M
Exmouth	+0 38	Devonport	St. Malo	+2 18	Brest
Falmouth	-0 46	Devonport	St. Mary (Scilly)	-1 16	Devonport
Fecamp	+6 57	Brest	St. Nazaire	-0 7	Brest
Ferrol	-0 47	Brest	Stornoway	+6 38	Greenock
Flamborough head	-1 59	Hull	Stromness (Orkneys) ..	-5 17	Leith
Fleetwood	-0 13	Liverpool	Sunderland	-0 1	N. Shields
Folkestone	-0 5	Dover	Swansea bay	-0 53	Weston-s-M
Fowey	-0 29	Devonport	Tay bar	-0 11	Leith
Flushing	+1 42	Dover	Tees bar	+0 22	N. Shields
Galway bay	-0 26	Queenstown	Tenby	-1 12	Weston-s-M
Gibraltar	-1 27	Brest	Thurso	-5 49	Leith
Glasgow (Port)	+0 10	Greenock	Torrey	+0 17	Devonport
Gloucester	+2 51	Weston-s-Mare	Tralee bay	-0 58	Queenstown
Granville	+2 26	Brest	Ushant (Ouessant)	-0 15	Brest
Gravesend	-0 48	London	Valentia harbour	-1 19	Queenstown
Grimsby (Great)	-0 53	Hull	Waterford	+0 19	Queenstown
Guernsey (St. Peter) ..	+2 50	Brest	Westport	-0 4	Queenstown
Hartlepool	+0 5	N. Shields	Wexford	+2 20	Queenstown
Harwich	-1 52	London	Whitby	+0 22	N. Shields
Havre	+6 4	Brest	Whitehaven	-0 9	Liverpool
Helgoland	+0 21	Dover	Wick	-2 55	Leith
Holyhead	-1 12	Liverpool	Wicklow	-0 41	Kingstown
Holy Island harbour ..	-0 53	N. Shields	Workington	-0 19	Liverpool
Honfleur	+5 42	Brest	Yarmouth road	-4 48	London
Inverness	-1 59	Leith	Youghall	+0 18	Queenstown

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	PLACE.	SUBJECT.
105	FRANCE—West Coast—Bay of Douarnenez—Millier Point	New light.
106	" " Douelan Harbour	Le Four Beacon damaged.
107	NORTH SEA—Hook of Holland Canal—North Mole Head	Alteration of light.
108	" " Hook of Holland Canal	Alteration in position of leading lights.
109	BALTIC ENTRANCE—Cadet Channel—Gledser Reef	Light-vessel temporarily withdrawn.
110	MEDITERRANEAN—France—Marseille	Temporary regulations.
111	" Pantellaria Island—Pantellaria	New harbour light.
112	" Italy—West Coast—Spezia	Green sectors of light in Mercantile port.
113	" Sicily—South Coast—Licata	New light on breakwater.
114	" Adriatic—Port Bari	Alteration in harbour lights.
115	" Gulf of Patras—Cape Papas	Lights temporarily discontinued.
116	BLACK SEA—Roumelia—Cape Eminch	Corrected description of light.
117	" Kertch Strait—Cape Yenikali	Provisional light (temporarily) for permanent light.
118	NORTH ATLANTIC—Azores—St. Michael—Ponta Delgada	Permanent light re-exhibited on breakwater.
119	SOUTH INDIAN OCEAN—Kerguelen Island	Dangerous rocks to southward.
120	EASTERN ARCHIPELAGO—Java—Sunda Strait—First Point	Permanent light re-established.
121	" " Sumatra—Sunda Strait—Flat Cape	Alteration in character of light.
122	CHINA—East Coast—Canton River	Sunken dangers.
123	SOUTH AUSTRALIA—Cape Northumberland	Alteration of light in 1882.
124	" " Spencer Gulf—Corney Point	Alteration of light in 1882.
125	SOUTH AMERICA—Dutch Guiana—Surinam River	Position of Bram point light-vessel.
126	UNITED STATES—Texas—Galveston	Alteration in colour of light in lightship.
127	" " South Carolina—Georgetown Harbour—Sampit River	New beacon light.
128	" " Maryland—Sharp Island	Lighthouse destroyed by ice.
129	" " Delaware Bay—Maurice River	Alteration in colour of light.
130	" " Delaware River—Cherry Island Flats	Fog-bell at Front Beacon.
131	NEWFOUNDLAND—South East Coast—Trepassey—Powles Head	Automatic signal-buoy adrift.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

105.—FRANCE.—West Coast.—Bay of Douarnenez.—Light on Millier Point.—On 15th March, 1881, a light was exhibited on the top of a semi-circular projection on the north front of the

keeper's house, recently constructed at the extremity of Millier point, south side of the bay of Douarnenez. It is a *fixed* light, visible between the bearings of S. $73^{\circ} 45'$ E. and N. $86^{\circ} 45'$ W., and will show as follows, viz. :—A sector of *white* light of $26\frac{1}{2}^{\circ}$, between Jaune and Vieille shoals ; a sector of *red* light of 6° , over Vieille shoal ; a second sector of *white* light of 13° between Vieille shoal and Le Bouc rock. The light will be obscured through a sector of $16\frac{1}{2}^{\circ}$, over Le Bouc rock and cape de la Chèvre. A third sector of *white* light of 105° , over the bay of Douarnenez as far as the rocks of point Jument. The light is elevated 112 feet above high water (20 feet above the ground)—the white light visible from a distance of 13 miles, the red light from a distance of 9 miles. Position, lat. $48^{\circ} 5' 57''$ N., long. $4^{\circ} 28'$ W. Variation, $19\frac{3}{4}^{\circ}$ W.

106.—FRANCE.—*West Coast.*—*Douélan Harbour.*—*Le Four Beacon Damaged.*—The upper part of the beacon erected on *Le Four*, Douélan harbour, has been washed away by the sea, and the masonry does not show much above high water at spring tide. The beacon will be repaired in the course of the year 1881.

107.—NORTH SEA.—*Hook of Holland Canal.*—*Alteration in North Mole Head Light.*—The illuminating apparatus of the light exhibited on the North mole head at the entrance to the Hook of Holland canal, has been renewed, and the following alteration made :—The light shows *white* seaward, except between the bearings of N.E. by E. $\frac{1}{2}$ E. and East, where it shows *red*, in order, by the change of colour, to serve as a guide in the entrance of the West gat, between black buoy A and white buoy A.

108.—NORTH SEA.—*Hook of Holland Canal.*—*Alteration in Position of Leading Lights (A and B).*—The white leading lights (A and B) indicating the fairway of the Noord gat, Hook of Holland canal entrance, have been shifted to the following positions :—The low light (A), elevated 16 feet above high water, is shown from a watch-house on the south mole, about 160 yards within the iron structure of the red light. Position, lat. $51^{\circ} 58' 35''$ N., long. $4^{\circ} 5' 35''$ E. The high light (B), elevated 39 feet above high water, is shown from a wooden frame work on the low shore

southward of the South mole, and bears S. by E. $\frac{1}{2}$ E. from the low light distant about 800 yards.

Note.—These lights in line bearing S. by E. $\frac{1}{2}$ E. lead about half a cable from the north mole head. Entering the canal, they should be kept so, until the red leading lights (C and D) on the north shore come in line. *Variation*, $16\frac{1}{2}^{\circ}$ W.

109.—BALTIC ENTRANCE.—*Cadet Channel.*—*Giedser Reef Light-Vessel Temporarily Withdrawn.*—Since January the Giedser reef light-vessel has been withdrawn from her station southward of Falster island, for the winter.

110.—MEDITERRANEAN.—*France.*—*Marseille.*—*Regulations during the Construction of a Bridge over the pass de l'Abattoir.*—During the construction of the pier of a swing bridge over the pass de l'Abattoir, in the port of Marseille, this pass will be closed to shipping at night. During the day, vessels may pass eastward of the caisson of the pier—that is, between the caisson and the eastern traverse de l'Abattoir, a width of 44 yards. The other part of the pass is closed at all times even to the smallest vessels. The works are indicated by the following signals:—During the day—by a disc painted red with small red flag above it, shown from the fore part of a lighter moored northward of the caisson. During the night—by three red lights, placed vertically, exhibited from the caisson of the pier; the lower light is 13 feet above the sea, the upper light 20 feet.

Note.—A chain is constantly extended across that part of the pass westward of the caisson; and as soon as the lights are exhibited, a chain is extended for the night across the eastern part of the pass.

The red lights usually shown from the mole heads of the Traverse de l'Abattoir, will not be exhibited until further notice.

111.—MEDITERRANEAN.—*Island of Pantellaria.*—*Pantellaria.*—*Harbour Light on San Leonardo Point.*—This light, on the northern side of entrance to the port of Pantellaria, is fixed red, elevated 39 feet above the sea, and visible three miles. The lighthouse is a small square white building (11 feet above which the light is shown), situated 27 yards from the shore. Position, lat. $36^{\circ} 50' 5''$ N., long. $11^{\circ} 56' 35''$ E.

112.—MEDITERRANEAN.—*Italy.—West Coast.—Gulf of Spezia.—Spezia Mercantile Port.—Sectors of Green Light.*—A sector of green light is shown to the south-east, and one to the north-east, from the lantern (gas) on the unloading wharf in the Mercantile port of Spezia. The lantern is the south-easternmost on the bank, fronting the lantern (double red) placed on the breakwater of the Mercantile port.

113.—MEDITERRANEAN.—*Sicily.—South Coast.—Light at Port Licata.*—Shown from the new breakwater near San Giacomo Castle point. It is a *fixed* light, and shows *red* between the bearings of S. 62° E. (through north) and S. 58° W., except between the bearings of N. 20½° E. and N. 55° E., through which arc (34½°) a sector of *white* light is shown. Elevated 32 feet above the sea, and visible 9 miles. The light is shown from an iron standard above a small square building, painted white. Position on Admiralty chart, lat. 37° 5' 40" N., long. 13° 57' 10" E.

Note.—The sector of white light indicates the channel between the breakwaters of the port, and vessels approaching the anchorage must keep within it, avoiding the red light; the arc of this sector may be altered as the harbour works progress, but the above directions will remain in force. *Variation, 11° W.*

114.—MEDITERRANEAN.—*Adriatic.—Port Bari.—Alteration in Position of Breakwater Light, Green Harbour Light Discontinued, Beacon Buoy Withdrawn.*—The red light shown from the breakwater in course of construction at port Bari has been moved 295 yards to the westward, and is now situated near the seaward end of the breakwater, and about 55 yards from its submerged extremity. The light, shown from a small tower constructed of masonry, is elevated 33 feet above the sea, and visible from a distance of 5 miles. The green light on the shore of the new harbour has been discontinued; and the beacon buoy that previously marked the submerged extremity of the breakwater has been withdrawn.

115.—MEDITERRANEAN.—*Gulf of Patras.—Cape Papas Light Temporarily Discontinued.*—The lighthouse on Cape Papas, south side of entrance to the gulf of Patras, is being replaced by one constructed of iron, and will be re-exhibited on 5th April, 1881.

116.—BLACK SEA.—*Roumelia*.—*Cape Emineh Light*.—*Corrected Description*.—With reference to previous notice on the exhibition of this light at the northern approach to Burghaz bay, it is a *flashing light*, with flashes every ten seconds—not a revolving light with a flash every thirty seconds, as previously stated.

117.—BLACK SEA.—*Kertch Strait*.—*Cape Yenikali*.—*Permanent Light Temporarily Discontinued, Provisional Light Exhibited*.—Consequent on intended alterations in the lighthouse on cape Yenikali (Yenikal or Fanár) the permanent light is temporarily discontinued; and in lieu thereof, a provisional light, similar in character to the permanent light, is now exhibited. The provisional light is elevated 380 feet above the sea, and is shown from a tower erected for the purpose, eastward of and near the old lighthouse. Further notice will be given when the permanent light will be re-exhibited.

118.—NORTH ATLANTIC.—*Azores*.—*St. Michael (San Miguel)*.—*Ponta Delgada*.—*Permanent Light Re-exhibited on Breakwater*.—The lighthouse has been repaired and the permanent light is re-exhibited. It is a *fixed red light*, elevated 69 feet above the sea (37 feet above the ground).

Note.—Vessels approaching Ponta Delgada, and waiting for a pilot, should not come within the distance of $2\frac{1}{4}$ cables from the lighthouse, in order to avoid the submerged portion of the breakwater.

119.—SOUTH INDIAN OCEAN.—*Dangerous Rocks Reported Southward of Kerguelen Island*.—Information relative to the existence of dangerous rocks lying about 17 miles southward of Kerguelen island, on the authority of Mr. Robson, master of the British ship *Salamanca*:—On 23rd November, 1880, during the voyage from London to Sydney, New South Wales, when proceeding southward of Kerguelen island—having passed Tremaree or Benodet islands, and after steering an E. by N. (*true*) course for 23 miles, a cluster of rocks (at first mistaken for an iceberg) was seen. The rocks, two of which are above water, and on which the sea was breaking very heavily, were passed at the distance of half a mile, and are stated to extend about 300 yards in a north-west and south-east direction, with apparently deep water around; the north-west rock

was estimated to be about 10 feet above water, the south-east end of the cluster was awash. As the southernmost of the Tremarec or Benodet islands is situated in about lat. $49^{\circ} 50' S.$, long. $69^{\circ} 4' E.$, or about 10 miles from the S.W. extremity of Kerguelen island; the above run from them would place the rocks in approximately, lat. $50^{\circ} 0' S.$, long. $69^{\circ} 30' E.$

120.—EASTERN ARCHIPELAGO. — *Java*. — *Approach to Sunda Strait*. — *First Point*. — *Permanent Light Re-exhibited*. — Shown on First point (Tanjong Kælong), and visible from a distance of 23 miles.

121.—EASTERN ARCHIPELAGO. — *Sumatra*. — *Sunda Strait*. — *Flat Cape (Vlakke Hoek or Pamantyooss point)*. — *Alteration in character of Light*. — This light is now flashing, showing every 30 seconds three flashes in quick succession, as follows:—Flash two seconds and eclipse three seconds, flash two seconds and eclipse three seconds, flash two seconds and eclipse 18 seconds.

122.—CHINA. — *East Coast*. — *Sunken Dangers in Canton River*. — During the last few years several sunken dangers have been discovered in the navigable channels of the Canton river used by shipping—the positions and descriptions of the most dangerous of them have been ascertained, and are as follows, viz. :—

1. Three knolls composed of sandstone in the fairway of the Eastern passage of the Second bar, each having a surface of about 17 square yards, and rising about 4 feet above the river bed, known respectively as—

- A. Wang Lan, the southernmost of the three, has 9 feet over it at low water spring tides, and lies 500 yards from the east bank of the river, with Second Bar pagoda bearing N. $66\frac{3}{4}^{\circ} W.$, and See Cheetow pagoda, S. $75^{\circ} W.$
- B. Tai Tub, the middle knoll, bears N. $24^{\circ} E.$ distant 150 yards from Wang Lan, has 12 feet over it at low water, and lies 405 yards from the bank, with Second Bar pagoda bearing N. $68\frac{3}{4}^{\circ} W.$, and See Cheetow pagoda, S. $74\frac{1}{4}^{\circ} W.$
- C. Tai Kweichan, the northern knoll, has 11 feet over it at low water, and lies 507 yards from the bank, with Second Bar pagoda bearing N. $71\frac{3}{4}^{\circ} W.$, and See Cheetow pagoda, S. $70^{\circ} W.$

2. About one mile above the Second bar, and nearly opposite Nimrod creek, is a rock locally known as Sai Sheklung; it is 150 feet in length (parallel with the bank), and 100 feet in width, with a least depth over it of 9 feet at low water spring tides, and lies 300 yards from the raised bank of Pottinger island, with Mammal hill bearing N. $69\frac{1}{2}^{\circ}$ W., Second Bar pagoda S. $41\frac{1}{2}^{\circ}$ W., and See Cheetow pagoda, S. $26\frac{1}{4}^{\circ}$ W. Fishing stakes are placed on and beyond this rock from November to March yearly.

Note.—Mammal hill is in lat. $23^{\circ} 3' 5''$ N., long. $118^{\circ} 27' 20''$ E.; it is a smooth round hill with conical summit, and is easily distinguished from the south-eastward, being the centre one of three cone-shaped hills.

3. Another rock known as Tai Sheklung, bears N.W. $\frac{1}{3}$ W. distant about half-a-mile from Sai Sheklung and 575 yards from the East bank; it is about 150 feet in extent, with a least depth over it of 11 feet, and 4 to 6 fathoms close around, lying with High peak of Tiger island bearing S. $14\frac{1}{2}^{\circ}$ E., See Cheetow pagoda S. 22° W., and Second Bar pagoda S. $33\frac{1}{2}^{\circ}$ W.

4. A rock of small extent, on which the steam vessel *Sin Nanzing* touched, having 10 feet over it at low water, lies nearly in mid-channel of Collinson reach, with hill (50 feet) on Danes island bearing N. $5\frac{1}{2}^{\circ}$ E.; the westernmost high peak (290 feet) on Danes island. N. 48° W.; and Matheson point N. 55° E.

5. A pinnacle rock with 8 feet over it, lies about 2 cables N.W. of the north end of Pedder island approach to Whampoa channel; from it Whampoa pagoda bears N. $84\frac{1}{2}^{\circ}$ W.

6. A rock of small extent, with 8 feet over it at low water, lies N. 68° W., distant 45 yards from the last-mentioned rock; from it Whampoa pagoda bears N. 85° W., and the small pagoda on the east end of Whampoa island S. 18° W.

7. A rock (*Powan*) about 50 feet in extent, on which the steam-vessel *Powan* ran in 1874, with a least depth over it of 5 feet, lies in the Whampoa channel, 183 yards from the north bank of the river, with the Joss house having a pagoda on the top bearing N. 83° W.; Inclined pagoda S. 82° W.; and Whampoa pagoda S. $34\frac{1}{2}^{\circ}$ E.

8. A rock about 20 feet surface with 7 feet over it at low water,

lies W. $\frac{1}{2}$ S. distant three-quarters of a mile from Powan rock, and 155 yards from the south bank, with the Joss house having a pagoda on the top bearing N. 73° W.; Inclined pagoda S. 81° W.; and Whampoa pagoda S. $68\frac{1}{2}^{\circ}$ E.

9. A conical rock with 8 feet over it at low water, lies W. $\frac{1}{2}$ N. from the last-mentioned rock and 187 yards from the south bank, with the little pagoda northward of Napier island bearing N. 78° W.; Inclined pagoda S. $78\frac{1}{2}^{\circ}$ W.; and Whampoa pagoda S. 71° E.

10. A reef projects 207 yards from the east side of the entrance to a small creek on the south bank of the river, about three-quarters of a mile above the fort on the east end of Napier island, with 5 feet over its outer edge, and less water inshore—from its outer edge, the little pagoda (northward of Napier island) bears N. 8° E.; and Inclined pagoda S. 82° E.

11. A rock with a least depth on it of 6 feet at low water, lies N. 45° E. distant 92 yards from Macao rock, and 73 yards from the high water mark at the rocky landing to the European cemetery, Macao reach—from it the western extreme of Honan island bears N. 28° W.; tower on Macao fort S. 27° W.; and Bush hill (146 feet), southward of Hamilton creek, S. 40° E.

12. A rocky patch with 10 feet over it, lies 300 yards from the western end of the Shamien bund, in line with the Joss house on the Fa-T (Fati) shore, and with Shamien church steeple bearing N. $54\frac{1}{4}^{\circ}$ E. Variation, $\frac{1}{2}^{\circ}$ E.

123.—SOUTH AUSTRALIA.—*Cape Northumberland.*—*Alteration of Light.*—On or about the 1st April, 1882, the character of the light at present shown on this cape will be altered from alternate flashes of red, white, and green to a revolving light, showing a bright flash every minute. The lighthouse and keepers' cottages will be removed a short distance to eastward of the present position. Further particulars will be given at an early date.

124.—SOUTH AUSTRALIA.—*Spencer Gulf.*—*Light on Corney Point.*—On or about the 10th January, 1882, it is proposed to exhibit a fixed white light from a lighthouse to be erected on Corny point. Further particulars will be given in due course.

125.—SOUTH AMERICA.—*Dutch Guiana.*—*Surinam River En-*

*trance.—Bram Point Light-Vessel.—Position.—*This light-vessel has been withdrawn, repaired and replaced at her station on the bar, Surinam river entrance, with Bram point bearing S.E. by S., distant 5 miles. *Variation, $\frac{1}{2}^{\circ}$ E.*

126.—UNITED STATES.—*Texas.—Change of Colour of Light on Galveston Lightship.—*On or about March 10, 1881, the light displayed from the lightship moored inside the bar, entrance to Galveston Bay, Texas, would be *fixed red*, instead of fixed white as formerly.

127.—UNITED STATES.—*South Carolina.—Georgetown Harbour.—Beacon Light at Sampit River Entrance.—*Shown from a beacon recently erected near Fort point, Georgetown, Sampit river entrance. It is a *fixed white* light, elevated 25 feet above high water. The light should be seen as soon as Frazier point is opened; it is shown from above the roof of a small lantern-room on a pile foundation, white in colour, and standing in 5 feet at low water. Position approximate, lat. $33^{\circ} 21' 20''$ N., long. $79^{\circ} 17' 20''$ W.

128.—UNITED STATES.—*Maryland.—Sharp Island Lighthouse Destroyed by Ice.—*This lighthouse at the mouth of the Choptank river, has been carried away by ice.

129.—UNITED STATES.—*Delaware Bay.—Maurice River Light.—Alteration in Colour.—*From 10th March, 1881, the light exhibited on East point, near Maurice river entrance, north shore of Delaware bay would be *fixed red* instead of fixed white as formerly.

130.—UNITED STATES.—*Delaware.—Fog-Bell at Cherry Island Flats Front Beacon-Light.—*A bell, struck by machinery, is now sounded at Cherry island range, Front beacon, Delaware river. The bell stands at the outer corner of the wharf, about 100 feet from the edge of the channel, and strikes a volley of blows every 15 seconds.

131.—NEWFOUNDLAND.—*South-East Coast.—Trepassey Harbour.—Powles Head—Automatic Signal-Buoy not in Position.—*The buoy has broken adrift, and there will not be any fog-signal there until further notice.

CHARTS, &c., PUBLISHED BY THE HYDROGRAPHIC DEPARTMENT
ADMIRALTY, IN JANUARY AND FEBRUARY, 1881.

No.		s	
265	Baffin bay :—Scott inlet and Eglinton fiord	...	1
1194	Spain, east coast :—Cartagena harbour	...	1
451	Jamaica :—Falmouth harbour. Annatto bay. St. Ann bay. Port Antonio.	...	1 6
199	Adriatic sea :—Brindisi to Ortona. (Plans, Viesti. Manfredonia. Trani. Barletta. Bisceglie. Molfetta. Bari. Mola. Monopoli. Pianosa island. Pelagosa island. Tremeti islands)	...	2 6
210	Plan added. Miyako bay.		
603	Plan added. Alongubuna anchorage.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

2567. England, east coast :—Tees bay.
2391. China sea :—Ports in Philippine islands.
811. China :—Anchorages between Black head and Crab point—
1601. China :—Wusung or Wongpu river.

INDIA.—MADRAS.—RULES FOR REGULATING THE ENTRY AND DEPARTURE OF VESSELS USING THE HARBOUR.—The following Notification has been published by the Madras Government, and is now issued for general information :—(1.) No vessel shall enter or leave the Madras harbour between the hours of 6 p.m. and 6 a.m. without special authority from the conservator of the port. (2.) Vessels about to leave the harbour shall hoist Flag N of the International (Commercial) Code at the fore. (3.) Vessels about to enter the harbour shall hoist Flag F of the International (Commercial) Code at the fore. (4.) Not more than one vessel shall enter or leave the port at the same time. Masters or other persons in charge of vessels, disobeying any of the foregoing rules, will, on conviction before a magistrate, be liable to a fine not exceeding one hundred rupees for every such offence, and also to the payment of the costs of such conviction.

OUR OFFICIAL LOG.

ILLEGAL BOARDING.

APPLICATION OF PROHIBITION TO ITALIAN VESSELS AND AT
ITALIAN PORTS.

At the Court at Windsor, the 2nd day of March, 1881. Present:

The Queen's Most Excellent Majesty in Council.

WHEREAS, by Section 5 of the Merchant Seaman (Payment of Wages and Rating) Act, 1880, it is provided that, where a ship is about to arrive, is arriving, or has arrived at the end of her voyage, every person, not being in Her Majesty's service, or not being duly authorised by law for the purpose, who

- (a.) Goes on board the ship, without the permission of the master, before the seamen lawfully leave the ship at the end of their engagement, or are discharged (whichever last happens); or,
- (b.) Being on board the ship, remains there after being warned to leave by the master, or by a police officer, or by any officer of the Board of Trade or of the Customs,

shall for every such offence be liable, on summary conviction, to a fine not exceeding twenty pounds, or at the discretion of the Court, to imprisonment for any term not exceeding six months, and the master of the ship, or any officer of the Board of Trade, may take him into custody and deliver him up forthwith to a constable to be taken before a court or magistrate capable of taking cognizance of the offence and dealt with according to law: And whereas by section 6 of the said Act it is further provided that, whenever it is made to appear to Her Majesty—

- (1.) That the Government of any foreign country has provided that unauthorised persons going on board of British ships which are about to arrive or have arrived within its territorial jurisdiction shall be subject to provisions similar to the provisions contained in the last preceding section as applicable to persons going on board British ships at the end of their voyages; and

- (2.) That the Government of such foreign country is desirous that the provisions of the said section shall apply to unauthorised persons going on board of ships belonging to such foreign country within the limits of British territorial jurisdiction ;

Her Majesty may, by Order in Council, declare that the provisions of the said last preceding section shall apply to the ships of such country, and, thereupon, so long as the Order remains in force, those provisions shall apply and have effect as if the ships of such country were British ships arriving, about to arrive, or which had arrived, at the end of their voyage : And whereas it has been made to appear to Her Majesty—

- (1.) That the Government of Italy has provided that unauthorised persons going on board of British ships which are about to arrive or have arrived within its territorial jurisdiction shall be subject to provisions similar to the provisions contained in the said herein first-recited section as applicable to persons going on board British ships at the end of their voyages ; and
- (2.) That the said Government is desirous that the provisions of the said first-recited section shall apply to unauthorised persons going on board of Italian ships within the limits of British territorial jurisdiction :

Now, therefore, Her Majesty, by virtue of the power vested in Her by the said recited Act, and by and with the advice of Her Privy Council, is pleased to declare that the provisions of the said first-recited section shall apply to Italian ships.

C. L. PEEL.

OFFICIAL INQUIRIES AT HOME, 1880-1.

891. *Bella Tumilty*, barquentine ; built at Berwick-on-Tweed, 1872 ; owned by Mr. J. Fisher and others ; tonnage, 190 ; Swansea to Venezuela ; coke, &c. ; lost on Los Roques, Venezuela, November 17, 1880, when loss of life ensued. Inquiry held at Liverpool, February 9, 1880, before Raffles, Judge ; Aplin, Forster, and Comyn, N.A. Loss occasioned by the master being

misled by the lighthouse on Los Roques having been incorrectly placed on the chart by which he was navigating his vessel.

892. *Lenore*, ship, and *John Dixon*, s.s.; the former built at Miramichi, 1865; owned by Mr. H. Latham and others; tonnage, 1,236; Tyne to Bombay; coal; the latter built at Wallsend, 1872; owned by Henry C. Bucknall and others; tonnage, 977; Huelva to the Tyne; copper pyrites and esparto grass; in collision off the Tyne, January 14, 1881, when the *Lenore* was sunk, and loss of life ensued. Inquiry held at North Shields, February 7, 1881, before Green and Cleugh, J.P.; White, Clarke and Anderson, N.A. Court found that both vessels were more or less to blame for the collision, and suspended the certificate of the master of the *John Dixon* for six months. The master of the *Lenore* was amongst the drowned.

894. *Express*, s.s; built at South Stockton, 1857; owned by Mr. J. Duff; tonnage, 941; London to Dumfries; patent manure; materially damaged and subsequently abandoned, December 5, 1880. Inquiry held at Westminster, February 1, 1881, before Rothery, Wreck Commissioner; Forster, Ronaldson and Miller, N.A. Accident due to breaking of the rod of the air pump. Master in default for taking the vessel to sea overladen and in an unseaworthy condition, and also in abandoning his vessel prematurely. Certificate suspended for six months; recommended for one as mate.

895. *Mary*, barque; built at St. John's, N.B., 1862; owned by Mr. J. Jones; tonnage, 346; Belize to United Kingdom; log-wood; abandoned at sea, January 15, 1881. Inquiry held at Liverpool, February 11, 1881, before Raffles, Judge; Aplin, Forster, and Comyn, N.A. Abandonment justifiable, rudder having been carried away.

899. *North Wales*, barque; built at Hull, 1876; owned by Mr. H. Roberts and others; tonnage, 1,090; the Tyne to Java; coals; lost on the Hasboro' Sands, January 16, 1881. Inquiry held at North Shields, before Jackson and Spence, J.P.; Curling and Harland, N.A., February 11, 1881. Loss due to a misapprehension on the part of the pilot as to the position of the vessel, and from the neglect to use the lead. Master reprimanded for trusting

too implicitly in the pilot, and for not verifying the vessel's position independently.

900. *Mildred*, s.s.; built at Whitby, 1879; owned by Mr. Turnbull; tonnage, 882; New York to Marseilles; wheat; posed to have foundered at sea. Inquiry held at Westminster February 10, 1881, before Rothery, Wreck Commission. Pickard, Castle and May, N.A. Loss probably due to being laden, having regard to the type of vessel, which does not appear suitable for the Atlantic trade during the winter months.

902. *Rook*, s.s.; built at Glasgow, 1878; owned by Robert A. Napier; tonnage, 274; Glasgow to Gothenburg; cargo stranded near Lochdoon, Island of Mull, January 16, 1881. Inquiry held at Glasgow, February 14, 1881, before Swan Shaw, J.P.; Ward and Cowie, N.A. Master in default for taking proper bearings whilst running along the land. Certificate suspended for six months. Mate admonished.

903. *Cresswell*, barque; built 1863; owned by Mr. J. C. I. Newcastle, N.S.W.; tonnage, 464; Liverpool to Cardiff; ballast stranded on Overton Beach, Glamorgan, January 27, 1881. Inquiry held at Swansea, February 18, 1881, before Fox Stip. Mag.; Clarke and Anderson, N.A. Master in default for steering improper courses, and for navigating in unseamanlike manner. Certificate suspended for three months. Mate's certificate suspended for six months.

906. *Island Belle*, barque; built at Bideford, Prince Edward Island, 1871; owned by Mr. J. Stewart, the master; tonnage, 312; Dublin to Ardrossan; ballast; stranded near Portpatrick, January 28, 1881. Inquiry held at Ardrossan, February 1881, before Mack and Bailey, J.P.; Ward and Parfitt, J.P. Master in default for standing into the land in a dense fog without taking a cast of the lead. Certificate not dealt with as he owned the vessel, and was uninsured.

907. *Mount Hermon*, s.s.; built at Linthouse, 1880; tonnage, 1,554; Glasgow to Genoa; pig iron and coals; stranded and on the breakwater, Genoa Harbour. Inquiry held at Glasgow, February 18, 1881, before MacLean and Swan, J.P.; Corrie Vaux, N.A., and Hallett, E.A. Master in default for naviga-

his vessel without a proper chart. Certificate suspended for three months. Mate censured.

908. *Gloamin*, s.s.; built at Dundee, 1880; owned by Messrs. Mudie; tonnage, 758; Sunderland to Dundee; coals. Lost near Borehills, Fifeshire, January 24, 1881. Inquiry held at Dundee, February 19, 1881, before Cox and Smith, J.P.; Curling and Murdoch, N.A. Master guilty of careless navigation, and want of caution. Certificates suspended for three months, and recommended for one as mate.

909. *Severn*, barque, *Mayumba*, s.s.; the former built at Southwick, 1867; owned by Mr. R. H. Gaynor; tonnage, 398; Sunderland to the Southward; coals; the latter (formerly the *Sicilian*) owned by the African Steamship Company; tonnage, 991; Madeira to Liverpool; general cargo and passengers; in collision at sea, January 30, 1881, when the barque foundered, and loss of life ensued. Inquiry held at Liverpool, February 21, 1881, before Raffles, J.P.; White, Wilson and French, N.A. Second mate of the steamer in default for not keeping a proper look-out; certificate suspended for six months.

913. *Clan Campbell*, barque; built at Sunderland, 1875; owned by Mr. T. Dunlop; tonnage, 728; Havre to Glasgow; ballast; lost on Ailsa Craig, January 17, 1881. Inquiry held at Glasgow, February 22, 1881, before Swan and Muir, J.P.; Beasley and Murdoch, N.A. Master to blame for not taking the services of a tug, and for attempting to go to windward of the Craig; certificate suspended for six months.

914. *Ruperra*, s.s.; built at Jarrow, 1877; owned by Mr. J. Cory and others; tonnage, 835; Alexandria to Hull; cotton seed; lost near Bolt Head, Devon, January 27, 1881. Inquiry held at Cardiff, February 18, 1881, before Jones, Judge; Castle and Harland, N.A. Accident caused by careless navigation on the part of both master and mate; certificates suspended for six and three months respectively.

916. *Eleanor*, s.s.; built at Hebburn, 1873; owned by North Western Railway Company; tonnage, 336; employed between England and Ireland carrying passengers and cargo; stranded at Leestone, Co. Down, January 27, 1881. Inquiry

held at Liverpool, February 24, 1881, before Raffles, Judge Clarke and Anderson, N.A. Master in default for neglecting use of the lead when approaching the Irish Coast; certificate suspended for three months.

920. *Rosalind*, s.s.; built in 1879; owned by Mr. G. Fenny and another; tonnage, 608; Middlesborough to Bilbao; stranded near Dunnose, Isle of Wight, January 8, 1880. Inquiry held at Middlesborough, February 24, 1881, before Coleman, Judge Castle and Vaux, N.A. Accident due to an error of judgment on the part of the chief officer.

921. *Hugh Taylor*, s.s.; built at Low Walker, 1869; owned by Mr. J. Straker and others; tonnage, 615; north coast of Africa to Leith; pig iron and esparto grass; stranded in Rye Hood's Bay, January 29, 1881. Inquiry held at North Shields, February 18, 1881, before Wait and Hedley, Justices; Kennedy and Cowie, N.A. Accident caused by the master mistaking Scarborough town lights for the Whitby town lights. Certificate suspended for three months.

922. *Bothalwood*, barque; built at New York, 1856; owned by Mr. T. R. Miller and others; tonnage, 912; Carthagena to Leith; esparto grass; lost on the Island of Jersey, January 18, 1881. Inquiry held at North Shields, February 17, 1881, before Healey and Swan, Justices; Kennedy and Cowie, N.A. Master to blame for neglecting the navigation of the vessel and for using the lead. Censured.

923. *Commodore*, schooner; built at Dartmouth, 1857; owned by Messrs. A. H. Tapson; tonnage, 156; Cardiff to Lismore by railway iron; abandoned at sea, January 31, 1881. Inquiry held at Cardiff, February 25, 1881, before Jones, Judge; Curling and Harland, N.A. Accident caused by stress of weather and shifting of cargo. Master justified in abandoning the vessel. Owner responsible for the vessel being overladen, and were ordered to pay £20 towards cost of enquiry.

924. *City of Richmond*, barque; built at Quebec, 1864; owned by Mr. D. Kennedy; tonnage, 1,241; Mobile to Liverpool; cotton; lost near the South Stack Light, February 3, 1881. Inquiry held at Liverpool, February 26, 1881, before Raffles,

Judge; Wilson and French, N.A. Master to blame in steering too easterly a course and for making no allowance for current. Certificate suspended for three months.

925. *Indian Chief*, ship; built at Quebec, 1877; owned by Messrs. Hatfield and Cassels; tonnage, 1,238; Middlesborough to Yokohama; coals; lost on the Long Sand, January 5, 1881, when great loss of life ensued. Inquiry held at Westminster, February 16, 1881, before Rothery, Wreck Commissioner; Powell, Harris and Ronaldson, N.A. Loss occasioned by wrong courses having been steered after passing Orfordness, and from no allowance having been made for the tide, and for which the pilot was solely responsible. Court had no power to deal with his certificate.

926. *Nymphæa*, s.s.; built at Sunderland, 1871; owned by Mr. J. Robinson; tonnage, 737; Shields to Athens; coals; lost on the Sunk Sand, January 5, 1881. Inquiry held at Westminster, February 15, 1881, before Rothery, Wreck Commissioner; Powell, Harris and Ronaldson, N.A. Loss occasioned by wrong course having been steered after passing Orfordness, and from no allowance having been made for the set of the tide. Master in default. Certificate suspended for six months; recommended for one as mate during that period.

927. *Peckham*, barquentine; built at Willington Quay, 1875; owned by Mr. C. Tully; tonnage, 323; Tyne to Demerara; coal; lost on the Horse Reef, near Scarborough, January 27, 1881. Inquiry held at North Shields, February 24, 1881, before Spence and Swan, Justices; Hight and Forster, N.A. Master in default for careless navigation and for leaving the vessel in charge of an uncertificated officer. Certificate suspended for six months.

928. *Stamford*, s.s.; built at Sunderland, 1880; owned by the Standard Steamship Company; tonnage, 869; Castro to Middlesborough; iron ore; lost on the Coast of Ushant, February 8, 1881. Inquiry held at Sunderland, February 28, 1881, before Booth and Ritson, Judges; Visconti, Cowie and Murdoch, N.A. Master guilty of improper and unseamanlike conduct, and of careless navigation. Certificate suspended for six months, and recommended for one as mate during that period.

929. *Claremont*, s.s.; built at Middlesborough, 1871; owned

by Mr. W. Wilson; tonnage, 668; Garrucha to Middlesborough Manganese iron ore; lost on Whale Chine, Isle of Wight, January 27, 1881. Inquiry held at North Shields, February 22, 1881, before Spence and Swan, J.P.; Hight and Forster, N.A. Casualty caused by careless navigation on the part of the master in running at full speed, in a fog, without taking a cast of the lead. Certificate suspended for six months.

930. *Emma Frances*, barque; built at Cornwallis, Nova Scotia, 1872; owned by Mr. J. E. Woodworth; tonnage, 615; Antwerp to Vera Cruz; railway iron; abandoned at sea. Inquiry held at Westminster, February 28, 1881, before Rothery, Wreck Commissioner; Forster and Castle, N.A. Casualty due to the vessel being overladen, and to having sprung a leak. Abandonment justifiable.

932. *Bohemian*, s.s.; built at Belfast, 1870; owned by a company; tonnage, 2,031; Boston to Liverpool; general cargo, live stock and passengers; lost on Mizen Head, February 6, 1881, when loss of life ensued. Inquiry held at Liverpool, March 2, 1881, before Raffles, Judge; White, Wilson and French, N.A. Casualty due to the vessel having been steered at full speed dangerously near the land in thick weather. The master and three officers lost their lives.

934. *Queen of England*; built at Quebec, 1858; owned by Mr. G. Otto; tonnage, 1,161; Port Glasgow to Quebec; ballast supposed to have foundered at sea. Inquiry held at North Shields, February 28, 1881, before Baker and Hedley, Judges; Pickard and Anderson, N.A. Court unable to form any opinion as to cause of loss.

935. *Eversfield*, s.s.; built at Wivenhoe, 1852; owned by Mr. J. Heathcock; tonnage, 70; Workington to Liverpool; pig iron stranded on Little Burbo Bank, Liverpool Bay, February 5, 1881. Inquiry held at Liverpool, March 4, 1881, before Raffles, Judge; Hight and Parfitt, N.A. Damage caused by the cargo falling on a weak bulkhead and the settling of the screw tunnel from the weight of the iron. Stranded through being unmanageable. Master's certificate not dealt with.

937. *Penelope Tutton*; built at Prince Edward's Island, 187

owned by Mr. Morgan Tatton; tonnage, 198; Tucacas to Swansea; copper ore; abandoned at sea, January 20, 1881. Inquiry held at Swansea, March 4, 1881, before Fowler, Judge; Curling and Kennedy, N.A. Vessel overladen. Master responsible. Censured.

938. *Gwendoline*, s.s.; built at Middlesborough, 1876; owned by Mr. H. A. Swan; tonnage, 328; Middlesborough to Grangemouth; pig iron; suffered material damage by striking on Craig Spurry, Inch Garvie Island, February 1, 1881. Inquiry held at Middlesborough, March 4, 1881, before Coleman, Judge; Comyn and Anderson, N.A. Master in default for proceeding in a dense fog. Certificate suspended for three months.

940. *Norma*, s.s.; built at South Shields, 1872; owned by Mr. H. R. Tully and others; tonnage, 652; the Tyne to Alexandria; coals; lost on Middle Cross Sands, February 10, 1881. Inquiry held at North Shields, March 4, 1881, before Shotton and Tully, Justices; Harris and Beasley, N.A. Master to blame for mistaking the Would Lightship for the Newarp Lightship, and setting the courses accordingly. Certificate suspended for three months.

OFFICIAL INQUIRIES ABROAD.

896. *Jeddah*, s.s.; abandoned by the master and mate when at sea, leaving some 900 native passengers to shift for themselves; when the second mate was drowned. Inquiry held at Aden, August 20, 1880. Master guilty of gross and cowardly conduct in thus prematurely abandoning his vessel. Certificate suspended for three years. The *Jeddah* was subsequently towed into Aden by the s.s. *Antenor*.

897. *Kate*, s.s.; lost on the Bar of the Bellinger River, June 13, 1880. Inquiry held at Sydney, December 8, 1880. Master guilty of error of judgment.

898. *Glenelg*, s.s. and *Duckenfield* s.s. In collision in Sydney Harbour, November 25, 1880. Inquiry held at Sydney, December 1, 1880. Both masters to blame. Censured and cautioned.

901. *Alice Lynne*, barquentine; abandoned by master and

crew near Bay Bulls, Newfoundland, January 16, 1880; but afterwards salvaged. Inquiry held at St. John's, January 20, 1881. Master justified in abandoning the vessel when he did.

904. *Star Beam*, barque; lost at East London, November 5, 1880. Inquiry held at East London, November 11, 1880. Loss due to stress of weather and from the vessel's chains parting.

905. *Hope*, barque; lost at East London, November 5, 1880. Inquiry held at East London, November 11, 1880. Loss due to stress of weather and from the parting of the cables.

910. *Kaffraria*, steam tug; lost at the entrance of the Kowie River, January 10, 1881. Inquiry held at Port Alfred, January 14, 1881. Master exonerated.

911. *Melpomene*; lost on an unknown rock near the Andaman Islands, September 23, 1880. Inquiry held at Rangoon, October 8, 1880. Master free from blame.

912. *Kate Bousfield*, barque; lost on the Eastern Breakwater, Cette. Naval Court held at Cette, February 11, 1881. Master exonerated from blame.

915. *Chingtoo*, schooner; lost at the entrance of Takow Harbour. Naval Court held at Taiwan. Master not to blame.

917. *Silver Craig*, barque; lost on Seca Island, off Port Polonio, Uruguay, November 7, 1880. Naval Court held at Monte Video, December 31, 1880. Casualty caused by an error of judgment on the part of the master.

918. *Lancastria*, barque; lost in Table Bay, December 31, 1880. Inquiry held at Cape Town. Casualty caused by the chains parting. Master in default in allowing the vessel to drift at the mercy of the elements, and taking no steps to get her under control.

919. *Mystery*; lost at Noumea, and enquiry held there. Master exonerated.

931. *Heather Bell*, brig; foundered at sea. Inquiry held at Sydney, December 15, 1880. Casualty due to the vessel having sprung a leak.

933. *Ocean King*, barque; lost near Port Nolloth, January 23, 1881. Inquiry held at Port Nolloth, January 27, 1881. No blame attached to master or officers.

936. *Mountain Ash*, barque; stranded at Mouille Point, January 8, 1881. Inquiry held at Cape Town, February 5, 1881. Master in default for not using the lead, and also for not letting go his anchor. Certificate suspended for twelve months.

939. *Rosalie*, brig; stranded on Salt Vley Point, February 1, 1881. Inquiry held at Port Alfred, February 8, 1881. Master free from blame.

GENERAL.

THE PATENT ISOCHRONOMETER is designed for the purpose of rendering the motion of all engines isochronous, by affording the means of reducing the motive power immediately after the first impulse of engines to accelerate their motion, and thus to obviate the dangers of broken shafts, &c., due to this cause. It is claimed that this invention enables the motive power of a steam engine making sixty revolutions a minute to be entirely suspended by an acceleration of five degrees, the time occupied being $\frac{1}{12}$ of a second.

ROBERTS'S TIDE PREDICTOR.—Mr. Roberts of the "Nautical Almanac" Office is authorised by resolution of Council of the Secretary of State for India, dated August 7, 1880, to make it generally known that his tide predictor may be employed for the preparation of tide tables (subject to the payment of a nominal fee to the India Office for the use of the machine) for any port for which the requisite data are forthcoming on application to him. The tide predictor has already been used for the preparation of the tide tables for 1880 for the ports of Bombay and Kurrachee (published by authority of the Secretary of State for India in Council) with the most satisfactory results. It has also been used for the tide tables for 1881 for Indian ports, which include, in addition to those of Bombay and Kurrachee, the tides also for Aden, Okha Point, and Beyt Harbour (Gulf of Cutch), Karwar, Beypore, the Paumben Pass, and Vizagapatam. The tide tables for 1882, the preparation of which is already far advanced, will

include, in addition to the above eight ports, the following seven—viz. : Madras, Rangoon, Moulmein, Port Blair, and, on the Hoogly River, Fort Gloster, Diamond Harbour, and Kidderpore (Calcutta). It is anticipated that, in addition to a still further number of Indian ports to be predicted for 1883, Mr. Roberts will have the preparation of tide tables for Table Bay, Port Elizabeth, East London, and Durban, tidal observations at these places being now in progress, or shortly to be commenced for this purpose. The observations when a sufficient series has been taken, will be placed in the hands of Mr. Roberts for the determination of the requisite data for the predictions.—*Nature*.

BRITISH MERCHANT SHIPPING.—A Parliamentary return, recently issued, shows the progress of British merchant shipping from 1840 to 1880, with special tables relating to trade with certain countries, passenger ships, apprentices, wages, relief of distressed seamen, and savings of seamen. The tonnage of British ships, sailing and steam vessels, with cargoes and in ballast entered and cleared at ports in the United Kingdom in 1860 was 13,914,923 tons, and this had risen in 1880 to 41,348,984 tons. The merchant navy of the British Empire had a tonnage of 5,710,968 in 1860, and 8,447,171 in 1880. In 1860 there were 171,592 British and foreign seamen employed in British steam and sailing vessels, 9 per cent. being foreigners ; and in 1880 the number had risen to 192,972, 13·72 per cent. being foreigners. In 1859-60 there was expended for the relief of distressed seamen £21,094 15s. 1d. ; and in 1879-80, £29,414 11s. 7d. By the savings banks account it appears that in 1860 £14,958 17s. 7d. was paid in, and in 1879 the sum of £59,118 18s. 2d. was received from seamen.

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THE ATLANTIC CATTLE TRADE.

THE heavy losses of cattle which occasionally take place on board vessels engaged in the Atlantic cattle trade, are beginning to receive a great deal of attention, both in America, and in this country. Although the transport of cattle from the United States and Canada to England is practically a new business, it has already assumed considerable proportions, and there is every probability of its further development. And on the whole it appears to be fairly well conducted. It was officially stated by Mr. Mundella in the House of Commons not long since that, "the great majority of the animals landed in this country from America arrived in excellent condition." Mr. Mundella further remarked that, "one steamship company in the course of fifteen months shipped 16,005 head of cattle, of which 15,852 were landed alive, and 80,465 sheep, of which 29,740 were landed alive."

These figures show that there is no inherent difficulty connected with the safe transport of live animals across the Atlantic. The instance above referred to is an example of what may be done in this respect; but at the same time, it is to be feared that equally favourable results are not obtained in all lines. In vessels which are not well adapted for the trade, or in which the animals are not

properly stowed, losses more or less severe are certain to occur, whenever the voyage is made under circumstances which are in any way unfavourable. And there can be no doubt that there are at present a number of steamers engaged in the trade which are by no means suitable for it. When the weather is fine a cargo of cattle can be brought across the Atlantic tolerably safe from risk in almost any vessel. The hatches can then be kept off, and the animals below are not in danger of suffocation; while those on the weather deck are not likely to be maimed or killed by exposure. But this is a state of things which cannot be reckoned on for several months in the year. Heavy weather may be experienced even in the midst of summer, but in the winter it is the rule rather than the exception. And it is during the rough passages that the difference between properly and improperly fitted vessels is brought most prominently to the front.

The Committee of Lloyd's have been in communication with the New York Association of Underwriters upon the subject, and have received from them several important suggestions with regard to the stowage and transport of cattle. The New York Board, as might be expected, entirely condemn the practice of carrying cattle on the weather deck during the winter months. They point out that, although it would perhaps be possible to construct the pens so as to afford some degree of protection, the loss and danger connected with this mode of stowage are such as to demand its discontinuance during the stormy season. And in this they are no doubt right. There is but little resemblance between the Continental and the American trades. Crossing the Atlantic in the middle of winter is an entirely different affair to the trip from Rotterdam to the Thames, and unless the fittings are exceptionally good and secure losses are almost certain to occur among the cattle shipped on the weather-deck. Even if they are not swept overboard or injured through the wreckage of the pens, a considerable number of them are almost certain to die from exhaustion consequent on exposure to the sea, and to the low temperature that generally prevails in mid-winter in the North Atlantic.

But the question of ventilation is of not less importance than that of stowage on deck. The losses from suffocation are probably

greater than those arising from exposure to the weather, since the former are experienced at all seasons of the year. The heat of summer is almost as trying to the animals stowed below as the cold of winter is to those carried on deck; and unless ample ventilation is provided serious losses may take place even with a smooth sea, when the weather is unusually hot. The New York Underwriters propose that:—"In addition to specifications as to the character of the construction of pens and fittings, and as to the superficial area required for each animal, their number should be limited in proportion to the cubical space of the compartment, and a definite system of ventilation provided to meet the requirement of cattle in each compartment in the event of all hatches being closed." This suggestion deals with the main difficulty connected with the long voyage cattle trade. By far the greater proportion of the losses that occur arise in vessels which rely solely on the hatchways for ventilation. As long as the weather is fine this matter is one of minor consequence; but if the hatches have to be closed for the safety of the ship, the suffocation of some of the animals is certain to be the result. There is, moreover, the question of health to be considered; for if cattle have crossed the Atlantic cooped up in a half-poisonous atmosphere, they can hardly be landed in a satisfactory condition.

It is to be hoped that the action taken by Lloyd's and by the New York Association of Underwriters will produce satisfactory results, and that shipowners will see their way to the adoption of measures which will render a system of official supervision unnecessary. It is in this latter direction that affairs seem at present to be tending. On the 11th February, Mr. J. G. Talbot inquired in the House of Commons whether the Government proposed to take steps for mitigating the existing evils, and was informed on behalf of the Privy Council Office that the Department were giving the matter their careful and anxious consideration. Whether any definite action will be taken remains to be seen; but the decision on this point probably rests in a great measure with owners and underwriters themselves. If vessels of an improper type, or with insufficient means of ventilating the lower decks, continue to be employed, or if live cargoes continue to be exposed

on the weather-deck in mid-winter, official interference may be regarded as certain to come about.

As respects the type of vessel suited for the cattle trade, the New York Association submit that water ballast vessels when cargo and cattle laden and with tanks empty are obviously dangerous. They point out that the lack of stability of such vessels can be met only by increased immersion through filling the tanks, and that this is oftentimes a dangerous remedy.

In all probability the evil which has manifested itself in the Atlantic cattle trade will tend to disappear as the business becomes more fully developed. The worst losses that occur are plainly due to defective ventilation, and the employment of the wrong class of steamer in the trade; but these are points that will eventually right themselves to a great extent by sheer force of competition. Vessels which are liable to lose a good proportion of their live cargoes whenever they encounter rough weather will necessarily be at a disadvantage as compared with those in which immunity from risk may be regarded as certain, except under very unusual circumstances. Whether matters will rectify themselves with sufficient despatch to satisfy public opinion is a question. We should be among the first to deprecate anything like hasty or undue interference with the trade; but at the same time, there are certain aspects of the subject which shipowners would do well not to ignore, and certain evils which they would do well to remedy if they wish to retain the entire control of the cattle carrying business.

ATLANTIC STORMS FROM AMERICA TO EUROPE.



HE storms which strike the British Islands come to us almost without exception from the Atlantic, and it will be interesting to trace their origin as far as may be possible, or, at all events, to trace them back for some days before they strike our shores. It is to such research that we may look for additional knowledge of weather changes and for the improvement of the means of weather prediction. It

at St. Petersburg at the same moment of time the barometer registered 31 ins., which gives a difference of 3·7 ins. Another discussion by the Meteorological Office was for the month of August, 1873, during which month a terrific storm raged in the Atlantic and which caused the loss of upwards of 500 lives, and the destruction or damage of more than 1,000 ships and nearly as many buildings in Cape Breton, Nova Scotia, and Labrador. This discussion by Captain Toynbee, though only for one month, is unquestionably the most complete discussion of the Atlantic weather which has ever been published, but even here the results would have benefited greatly by observations from a larger number of ships.

Among other attempts at throwing light upon the storms which traverse the Atlantic is the praiseworthy endeavour of the United States Government to track all storm-centres which show themselves anywhere in the North Atlantic, or indeed anywhere in the northern hemisphere; but as far as the ocean is concerned this limits itself greatly to the North Atlantic, since it is in that ocean alone that the data are at all sufficient for the purpose, and here, again, we must regret that more numerous observations are not obtained, since it is on the number of observations alone that the value of such a discussion depends, the quality of the observation in such a general discussion forming a somewhat unimportant factor, the observation, broadly speaking, reducing itself to the fact of whether or not a gale is blowing.

The writer had an opportunity of testing the reliability of these storm-tracks when making an examination of the weather experienced in the North Atlantic during February and March, 1880, the period in which H.M.S. *Atalanta* was lost.

This tracking of the storm-centres over the North Atlantic, as set forth in the maps which form a part of the "Monthly Weather Review," published by the Signal Office of the United States Government, affords material for the present paper, and we have taken from these charts all the storm-tracks which are given in the North Atlantic during 1879, and have expressed in words what is there shown graphically, adding just so much as will enable judgment to be formed as to how far the storms experienced in the

British Islands are connected with those which have been previously blowing over the Atlantic, and also to what extent the storms of America may be connected with Europe and especially with our own Islands.

The track of each storm-centre, which is shown as having appeared anywhere in the North Atlantic, is dealt with in the following list, and particulars detailed as to its subsequent behaviour.

The whole of the year 1879 is dealt with, since doubtless the tracks of the storms, as well as the storms themselves, differ materially in the different months.

The number which precedes each storm-centre is a guide as to its chronological order, and the letters which follow this number serve as an index to the movement of the storm, and have the following signification :—

a, left American waters.

b, began in Atlantic clear of America.

c, crossed the Atlantic to European coasts, or came in.

d, disappeared in Atlantic.

With storms which struck the European coasts a word or two is added showing the nature of such storms. When a gale is mentioned it must be understood to be not less than a fresh gale, or force 8 of Beaufort's scale.

JANUARY.

1. *b*. and *d*. First appeared in mid-Atlantic, January 1, in 40 N. and 40° W., and after being tracked about 1000 miles to N.N.E., was lost on 3rd.

2. *a*. and *c*. Was situated close to the south of Newfoundland, January 4, and tracked in an E.N.Ely. direction as far as the English Channel on 11th. This caused a strong gale at the entrance to the English Channel.

3. *b*. and *c*. Started in mid-Atlantic 44° N. and 48° W., January 8, and joined with No. 2 on 9th, arriving in English Channel on 11th.

4. *a*. and *c*. Crossed the S.E. part of Newfoundland, January 10, and afterwards took a N.Ely. track, passing the meridian of

Greenwich in 67° N. on 15th. Strong Wly. winds blew in British Islands and gale on coast of Norway.

5. *b.* and *c.* First shown in 53° N. and 19° W., January 14, took a S.Ely. track across the Bay of Biscay, and entered France on 16th. A strong Ely. gale blew at Scilly and a Wly. gale on coast of France.

6. *a.* and *c.* Passed over the north of Newfoundland, January 15, and took a N.Ely. course, passing over Iceland on 18th. This caused a Sly. gale in Scotland.

7. *a.* and *c.* Left the coast of America, near New York, January 16, travelled to the E.S.E., but on 17th it took a course to the N.Ed., and subsequently on 19th it again took a S.Ely. course, and finally struck the coast of Portugal on 22nd. This was accompanied by strong Ely. winds over England and a gale in English Channel.

8. *a.* and *d.* Left the coast of America in 37° N., January 19, and, after travelling to the N.Ed., was lost to the north of Newfoundland on 21st.

9. *a.* and *c.* Left the coast of America in 43° N., January 23, passed south of Newfoundland and between Iceland and Scotland on 26th. Caused S.Wly. winds to blow over the Nn. part of the British Islands and reached the force of a fresh gale at Stornoway.

10. *a.* and *d.* Passed over Nova Scotia, January 25, and was lost to the South of Greenland on February 27.

FEBRUARY.

1. *b* and *c.* First shown in mid-Atlantic, 35° N. and 40° W., January 29, and travelled N.Ely., entering the Nn. part of France, February 4. Winds drew N.Ely. over England.

2. *a* and *c.* Left the coast of America at 35° N., January 31, and followed a N.Ely. track, passing to the south of Newfoundland, February 2, and to the north of Scotland on 7th and 8th. Caused Sly. to Wly. winds all over the United Kingdom, and a gale in places.

3. *a* and *c.* Left the coast of America in 38° N., February 5, and took an E. by N. course to the 40th meridian, then travelled more N.Ely., and was off the entrance to the English Channel on 11th. A Sly. gale blew on French coast and in English Channel.

4. *a* and *c*. Passed over Nova Scotia, February 10, took an E.N.Ely. course, and arrived off the entrance to English Channel on 14th. Caused strong Ely. winds over England and Scotland.

5. *a* and *c*. Passed over the Nn. part of Newfoundland, February 13, took a course to the E.N.E. as far as 20° W., then travelled to the S.E., and was situated over the Irish Channel on 20th. Fresh Wly. gales blew at our Wn. stations.

6. *a* and *c*. Skirted the south of Newfoundland, February 22, took a N.Ely. course, and passed to the north of Scotland on 27th. This drew the winds into S.W. over the whole of the United Kingdom.

MARCH.

1. *b* and *c*. First appeared in mid-Atlantic, 42° N. and 46° W., March 2, took a N.Ely. course, and passed to the north of Scotland on 4th. Caused a Sly. gale in Scotland and Ireland.

2. *a* and *d*. Shown to the north of Newfoundland, March 5, but subsequently disappeared.

3. *b* and *c*. First shown in mid-Atlantic, 32° N. and 45° W., March 6th, took a N.Ely. track, and passed just to the north of Scotland on 9th. Caused Wly. winds all over England, and a gale in Scotland and Norway.

4. *a* and *c*. Passed over the south of Newfoundland, March 12, took an E.N.Ely. course to the meridian of 30° W., after which it travelled S.Ely., and eventually entered Spain on 19th. Caused Ely. winds all over England and France.

5. *a* and *c*. Passed over the north of Newfoundland, March 15, took an E.N.Ely. track to 30° W., then travelled S.Eds., and crossed the Bay of Biscay on 18th. Caused Ely. winds all over England.

6. *a* and *d*. Passed over Florida, March 18, then travelled to the E.N.E., but disappeared after reaching 48° N. and 40° W. on 20th.

7. *a* and *c*. Left the coast of America in 39° N., March 21, took an E.N.Ely. course, and crossed the Bay of Biscay on 27th. Ely. winds blew all over England, and a gale in places.

8. *a* and *c*. Left the coast of Labrador and passed to the north of Newfoundland, March 25, travelled E.S.Eds. to the meridian of

40° W., then took a track to the E.N.E., and passed over the north of Scotland on 31st. Caused S.Wly. winds all over England, and a gale in Ireland.

9. *a* and *d*. Left the coast of America near New York, March 27, travelled E.S.E. to 60° W., then for a short distance to the E.N.E., and disappeared at 45° W. on 30th.

APRIL.

1. *a* and *c*. Left the coast of America in 36° N., March 30, passed over Nova Scotia, April 1, and Newfoundland on 2nd; took an E.N.Ely. course to the meridian of 30° W., then travelled to the E.S.E., skirted the south of Ireland on 6th, and entered the north of France on 7th. Caused a Sly. and Wly. gale in the west of the British Islands.

2. *a* and *c*. Passed over Nova Scotia, April 4, over Newfoundland on 5th, then followed a direct course to the E., and arrived in the English Channel on 8th. Caused a cyclonic circulation of winds, but force generally only fresh.

3. *b* and *d*. First shown, April 7, about 250 miles to the S.S.E. of Newfoundland, and was lost on 8th, after travelling a few hundred miles to the N.Ed.

4. *a* and *c*. Crossed the north of Newfoundland, April 9, and after a somewhat erratic course, arrived off the English Channel on 15th. Caused N.Ely. winds all over the United Kingdom, and a gale in the English Channel.

5. *a* and *c*. Left the coast of Labrador, April 14, and took a course slightly to the south of E., and arrived off the south of Ireland on 20th. Caused a cyclonic circulation of winds over the British Islands, and a gale in Ireland.

6. *a* and *c*. Left the coast of America in 36° N., April 18, travelled to the E.N.E., and passed over Ireland on 23rd, and England on 24th. A strong gale blew at the entrance of the English Channel.

7. *b* and *d*. First appeared about 500 miles to the east of New York, April 23, and after travelling very slowly to the eastward, eventually took a course to the N.N.E., and was lost between Greenland and Iceland on 29th.

8. *b* and *c*. First appeared in 56° N. and 85° W., April 23, and took an E.S.Ely. course across the Bay of Biscay, and crossed France on 27th. Caused a N.Ely. wind all over England, and a Wly. gale in France.

MAY.

1. *b* and *c*. First shown about 400 miles to the west of Scotland, May 16, and travelled to the S.E. for one day, crossing Ireland on 17th, then took an Ely. course across England. Caused a cyclonic circulation of winds, but only fresh to strong in force.

2. *a* and *d*. First shown in 33° N. and 70° W., May 22, took a N.Ely. course, crossing Newfoundland on 26th, and was lost on 27th.

3. *b* and *c*. Crossed the north of Iceland, May 24, and travelled to the S.E., passing down the Irish Channel on 26th. This storm, after passing over the north of France, took a course to the N.d., and passed up the German Ocean. Caused fresh to strong winds.

JUNE.

1. *b* and *c*. Appeared in 44° N. and 80° W., June 4, took an E.N.E. course, and arrived in the St. George's Channel on 8th. Caused a cyclonic circulation, but of little force.

2. *a* and *d*. Left Labrador, June 9, and was lost on 10th, after travelling a short distance to the N.E.d.

3. *b* and *c*. Started in 43° N. and 17° W., June 10, travelled to the N.N.E., and passed over the centre of Ireland on 12th. Cyclonic circulation, but winds of no force.

4. *a* and *c*. First appeared about 400 miles to the S.S.E. of Newfoundland, June 10, took a N.Ely. track and arrived off the entrance to the English Channel on 16th. Caused cyclonic circulation, but winds of no force.

5. *b* and *c*. First appeared in 48° N. and 40° W., June 12, took an E.N.Ely. course and passed over the south of England on the 16th. Caused cyclonic circulation, but winds of no force.

6. *a* and *c*. Passed between Nova Scotia and Newfoundland, June 18, and after travelling for a day in a S.Ely. direction and reaching 50° W., it took an E.N.Ely. course and passed over Ireland on 21st. A Wly. gale blew in the west of the British Islands.

7. *a* and *d*. Left American coast near New York, June 16, and after travelling to the meridian of 50° W. by 18th, subsequently disappeared.

8. *b* and *c*. First appeared in 58° N. and 30° W., June 22, took an Ely. course and passed over Scotland on 24th. Caused a cyclonic circulation, but winds of no force.

9. *a* and *c*. Left the coast of Labrador, June 23, followed an E.S.Ely. track to 30° W., then took a N.Ely. course and passed to the north of Scotland on 28th. Caused a S.Wly. gale in Ireland.

10. *b* and *c*. First appeared in 52° N. and 20° W., June 30, skirted the coast of Ireland, July 1, and passed over the north of Scotland on 2nd., travelling to the E.N.E. A strong gale blew in the United Kingdom, July 1 and 2.

JULY.

1. *a* and *c*. Crossed the north of Nova Scotia, July 4, took an E.N.Ely. course and crossed Scotland on 9th. Wly. gales blew over England and Ireland on 8th and 9th.

2. *a* and *c*. Passed over the north of Newfoundland, July 4, and on 5th joined with storm-centre No. 1, crossing Scotland on 9th.

3. *a* and *c*. Left the coast of America to the West of Newfoundland, July 9, passed south of Newfoundland on 11th and 12th, and was then travelling N.Eds., its track was afterwards more to the E., and it passed up the English Channel on 16th. Caused a strong S.E. gale at Scilly.

4. *a* and *d*. Left the coast of Labrador, July 25, and struck Iceland on 28th. This caused a S.Wly. wind all over the British Islands.

5. *a* and *c*. Left the coast of America in 43° N., July 27, travelled to the E.N.E., and passed about 250 miles to the north of Scotland on August 1. Caused Wly. winds all over the British Islands and a Sly. gale on the coast of Norway.

AUGUST.

1. *b* and *c*. First shown in 47° N. and 12° W., August 3, passed over Ireland and Scotland on 4th, and kept a course parallel to

the coast of Norway. Caused a cyclonic circulation of winds over the British Islands, but of little force.

2. *b* and *c*. First shown a little distance off the entrance to the English Channel, August 5, and passed over the north of England on 6th. A gale blew in England.

3. *a* and *c*. Passed to the north of Nova Scotia and south of Newfoundland, August 7, followed an Ely. track to 80° W., but afterwards took a much more Nly. direction, and passed between Scotland and Iceland on 13th to 14th. Caused a Sly. gale in Scotland.

4. *b* and *d*. First shown in 35° N. and 72° W., August 9, and after travelling about 600 miles to the E.N.E., it disappeared.

5. *a* and *d*. A West Indian Storm. First shown in 18° N. and 62° W., August 13, followed a W.N.Wly. course, skirting the Bahamas, then kept a track nearly parallel with the American coast after recurving to N.E. and was subsequently lost just to the south of Newfoundland on 20th.

6. *b* and *d*. A purely tropical storm. First shown in 13° N. and 44° W., August 15, and was lost on 16th after being tracked for about 500 miles to the Wd.

7. *b* and *c*. First shown in 55° N. and 20° W., August 15, and passed over Ireland and central England on 16th to 17th. Caused a Wly. gale in English Channel.

8. *b* and *c*. First shown in 53° N. and 28° W., August 20, took a N.Ely. course, and passed between Scotland and Iceland on 22nd. A gale blew on Norwegian coast.

9. *b* and *d*. A tropical storm. Shown in 18° N. and 40° W., August 21, but not tracked.

10. *a* and *d*. Commenced in the Caribbean Sea, August 20, passed over the Gulf of Mexico on 22nd, crossed part of the United States, and entered the Atlantic near Cape Hatteras on 26th, and was finally lost slightly to the S.E. of Newfoundland on 31st.

11. *a*. and *c*. Crossed the north of Newfoundland, August 24, and passed to the north of Scotland on 28th. A strong gale blew in England and Ireland.

SEPTEMBER.

1. *a*. and *c*. First shown in 35° N. and 65° W., August 28, and followed a N.Ely. course, passing between Scotland and Iceland,

September 2, and struck the coast of Norway on 3rd. A strong gale blew in Ireland and on Norwegian coast.

2. *b.* and *c.* First shown in 45° N. and 32° W., September took a N.Ely. track and crossed Ireland and Scotland on 7th to 9th. A gale blew in Ireland and England.

3. *a.* and *c.* Crossed the north of Newfoundland, September travelled to the E.N.E., and passed just to the north of Scotland 12th to 13th. A gale blew on the coast of Norway.

4. *a.* and *d.* Left the coast of Labrador, September 18, and subsequently tracked.

5. *b.* and *c.* First shown in 53° N. and 23° W., September and passed just to the north of Scotland on 23rd. A gale blew Scotland and in the north of England.

6. *a.* and *c.* Crossed Newfoundland, September 25, and passed to the south of Iceland on 28th. Caused a gale in Scotland and Ireland.

OCTOBER.

1. *b.* and *c.* First shown in 57° N. and 20° W., September 30, took an E.N.Ely. track, passing to the north of Scotland on October 2, and entered the coast of Norway on 3rd. Caused a gale in Scotland.

2. *a.* and *d.* Crossed the north of Newfoundland, October 4, travelled E.N.Es., and was lost to the south of Greenland on 6th.

3. *a.* and *d.* Crossed the Caribbean Sea and Gulf of Mexico from October 3 to 6, and travelled but a short distance over the United States.

4. *b.* and *c.* Commenced in 38° N. and 45° W., October 9, and took a direct Nly. track until a short distance south of Greenland, then an E.N.Ely. track, and passed to the south of Iceland on 16th and entered Norway on 17th. Gale in Scotland and Ireland.

5. *a.* and *c.* Commenced in Caribbean Sea, October 10, took a N.Wly. course over the Gulf of Mexico, crossed the United States and passed over Lake Michigan on 17th, when it recurved and took an E.N.Ely. course, crossed Newfoundland on 20th, and passed to the north of Scotland on 24th. Caused Wly. winds over the United Kingdom, but not of much force.

6. *a.* and *d.* Commenced in the Gulf of Mexico, October 26

and took an E.N.Ely. course passing over Florida, Nova Scotia, and Newfoundland, to the north of which it was lost on 30th.

7. *b* and *c*. First shown at a short distance off the coast of Portugal, October 26, and finally crossed Spain.

NOTE.—In October and November a good few storms apparently had their origin to the north of lat. 60° N. and in about the longitude of the British Islands and travelled direct for Norway. These have been omitted as beyond the present consideration.

NOVEMBER.

1. *a* and *c*. Passed to the south of Nova Scotia, November 4, crossed Newfoundland on an E.N.E. course, and passed between Scotland and Iceland on 9th. A strong gale on the coast of Norway.

2. *b* and *d*. First shown in 20° N. and 28° W., November 5, and disappeared after travelling 600 miles to the Nd.

3. *a* and *d*. Left the coast of America in about 43° N., November 13, and, after travelling a short distance to the E.S.E., was lost.

4. *a* and *d*. Crossed the north of Newfoundland, November 16, took an Ely. course, and disappeared after arriving at 20° W. on 20th.

5. *a* and *d*. Left the coast of America in 38° N., November 18, and, after following an E.N.Ely. track to 30° W. on 20th, disappeared.

6. *a* and *d*. First shown to the south of Florida, November 19, travelled to the N.Ed., crossed Nova Scotia and the Gulf of St. Lawrence on the 21st, after which it disappeared.

7. *b* and *c*. First shown off the entrance to English Channel, Nov. 21, crossed central England on 22nd, and struck the coast of Norway on 23rd. Caused a gale in places on 21st.

8. *b* and *c*. Commenced in 23° N. and 27° W., November 23, followed a N.N.E. track, and entered the north of Spain on 28th.

9. *a* and *d*. Left Labrador, November 26, took a S.Ely. course, and was lost in 40° N. and 40° W. on 29th.

DECEMBER.

1. *b* and *c*. First shown in 40° N. and 45° W., November 29, travelled S.Ed. to 35° N. and 30° W., December 1, then N.Eds., crossed the Bay of Biscay, and entered France on 4th. Caused a

strong Ely. gale in English Channel and hurricane in Bay Biscay.

2. *a* and *c*. Crossed Newfoundland, December 5, travelled N.E. passed over Iceland on 7th, and struck the coast of Norway on 9th.

3. *b* and *d*. First shown in 32° N. and 80° W., December 8, and after travelling to the N. disappeared in 50° N. and 80° W. on 11th.

4. *a* and *d*. Left Labrador, December 12, and lost to the S. of Greenland on 18th.

5. *a* and *c*. Crossed the north of Newfoundland, December 17, travelled to the E.N.E., and passed to the north of Scotland 21st to 22nd. Gale in Scotland.

6. *a* and *d*. Left the coast of Labrador, December 21, and disappeared to S.E. of Greenland, 22nd.

7. *a* and *c*. Crossed Newfoundland, December 23, took E.N.Ely. course, and skirted the north of Scotland on 27th. Caused a strong gale in British Islands.

8. *a* and *c*. Skirted the north of Newfoundland, December 27, travelled E.N.Es., and crossed Scotland, 28th to 29th. A strong gale blew in the British Islands.

Summarising these details we get the following results :—

MONTH.	Total Number of Storm-centres observed in N. Atlantic.	Storms which left American Waters.			Storm which began in Atlantic clear of America.			No. of instances in which fresh gale on European coasts in Storm which crossed from America to Europe.
		Total.	Crossed Atlantic.	Disappeared.	Total.	Crossed Atlantic or came in.	Disappeared.	
January ...	10	7	5	2	3	2	1	5
February ...	6	5	5	—	1	1	—	3
March ...	9	7	4	3	2	2	—	2
April ...	8	5	5	—	3	1	2	4
May ...	3	1	—	1	2	2	—	—
June ...	10	5	3	2*	5	5	—	2
July ...	5	5	4	1†	—	—	—	4
August ...	11	4	2	2	7	4	3	2
September...	6	4	3	1†	2	2	—	3
October ...	7	4	1	3	3	3	—	—
November ...	9	6	1	5*	3	2	1	1
December ...	8	6	4	2†	2	1	1	4
YEAR ...	92	59	37	22	33	25	8	30

* One of the number entered Atlantic from the coast of Labrador.

† All entered the Atlantic from the coast of Labrador.

These figures show that out of 59 storms which left America in the course of the year, 37 (63 per cent.) crossed the Atlantic to the European coasts, and of these 30 (81 per cent.) were accompanied by the force of a fresh gale at European stations. It will also be seen that out of 62 storms which struck the European coasts, 37 (60 per cent.) left American waters.

The time occupied in a storm traversing the Atlantic from America to Europe averages five days. The 37 cases are distributed in the following manner :—

No. of days in crossing from America to Europe ... 3 | 4 | 5 | 6 | 7 | 8

No. of storms occupying the respective periods ... 3 | 10 | 10 | 8 | 5 | 1

So that the period of from four to six days for the passage of a storm across the Atlantic is likely to prove correct three times out of every four.

The average speed of all the storms which crossed the Atlantic during the year is about 18 miles per hour, and many other instances in which the rate of progress of storms in the Atlantic has been tested would fully support this.

The general Ely. track of all storms which blow in the Atlantic to the north of the tropics has long been well-known.

It must not be overlooked that although we may know that the majority of storms come to us from the other side of the Atlantic, yet we cannot say that any special storm which leaves the coast of America will reach us, and, of course, there is still greater uncertainty, even if the storm does reach this side of the Atlantic, as to which part of the coast of Europe it will strike.

The weather over the British Islands during the spring and summer of 1879 was exceptionally wet and cold, and probably this was greatly due to the frequent passage of storm-centres passing over us from the Atlantic, yet even if the year here dealt with does not happen to represent an average year, the figures sufficiently prove the very intimate connection between American and European weather.

A MERCANTILE MARINE COLLEGE.

THE Royal Naval Academy at Portsmouth was founded by George II., in 1729, and became the Royal Naval College, by an order in Council of George III., 1806, instituted with a view of training up, constantly, 40 to 70 young gentlemen in the principles of navigation, marine surveying, gunnery, fortification, mechanics, drawing, and various other studies, preparatory to their entrance into actual service. The establishment of officers for conducting the affairs of the college consisted of "a governor, lieutenant-governor, an inspector; a professor, preceptor, mathematical tutor, and house-keeper; a writing, drawing, French, fencing, and dancing master, a surgeon, the master-attendant of the dockyard, the master-shipwright of the yard, and a gunner of marine artillery; the whole under the direction of the Lords Commissioners of the Admiralty and the First Lord, for the time being, considered as governor."

As time rolled on the boundaries of tuition and of examination were necessarily enlarged, but were still inadequate to the exigencies of the service and the standard required by a public opinion that was rapidly extending its educational views, especially in respect to science. When, however, the learned professions had been called upon to set their houses in order, and see that the members composing their respective bodies were educated in accordance with the advancing intelligence of the age, it was time that something should be done in the same direction for the Royal Navy. It had long been notorious that the mathematical and scientific training of the officers of that service was defective, as like that of the officers of the Mercantile Marine, greatly inferior to the training of their foreign *confrères*; their examination papers even the very books most in use among them sufficiently illustrated this fact. We say this without intending any disparagement of the men themselves: it was the system. None ever doubted the courage and personal prowess of the officers and men of the Royal Navy; these are, and always have been, their characteristic distinction. The same may be said of our merchant officers;

the hour of danger they are always equal to the occasion. But in the past a narrow system has been the failing of both services ; especially was it unable to appreciate the fact that " knowledge is power," that an increase of knowledge contributes to render man a more powerful agent than when he is ignorant, and that there are special sciences the utilitarian value of which is not at first perceptible.

In this view it cannot be doubted that it was a most judicious step—one of capital importance to the Navy—when the Government of the day, despite the opposition of some and the prejudices of others, resolved to convert the then disestablished, but once famous old Greenwich Hospital, into a Royal Naval College—the best use to which, under the circumstances, it could be put. This was accomplished by Her Majesty's order in Council, dated the 16th of January, 1873.

Under the presidency of an Admiral and an able director of studies, assisted by numerous professors and instructors, the Royal Naval College is so organised as to provide for the education of naval officers of all ranks above that of midshipmen in all branches of theoretical and scientific study bearing upon their profession ; it is also open to naval instructors and engineers of various grades ; besides which a course of instruction is provided for a limited number of private students of naval architecture or marine engineering, and for officers of the Mercantile Marine to the number of ten.

The *courses of study* embrace a wide range of subjects, and appear to have been selected with considerable judgment in respect to the purpose intended. They are as follow :—1. Pure mathematics, including co-ordinate and the higher pure geometry, differential calculus, finite differences, and the calculus of variations. 2. Applied mechanics, viz., pneumatics, mechanics, optics, and the theories of sound, light, heat, electricity, and magnetism. 3. Applied mechanics, including the theory of structures, the principles of mechanism, and the theory of machines. 4. Nautical astronomy, surveying, hydrography, with maritime geography, meteorology and chart drawing. 5. Experimental sciences—(a) physics, viz., sound, heat, light, electricity, and magnetism ;

(b) chemistry; (c) metallurgy. 6. Marine engineering in all its branches. 7. Naval architecture in all its branches. 8. Fortification, military drawing, and naval artillery. 9. International law and maritime law; the law of evidence and naval courts-martial. 10. Naval history and tactics, including naval signals and steam evolutions. 11. Modern languages. 12. Drawing. 13. Hygiene—naval and climatic. From a professional standpoint, this is an educational programme of exceeding value.

In closing these remarks on the recently established Royal Naval College at Greenwich, we cannot refrain from quoting one paragraph from the Minute of the Board of Admiralty:—

“The paramount object which the Board has pursued in the organisation of the College has been to provide the most efficient means for the higher education of Naval Officers adequate to the constantly increasing requirements of the service; but the Board also anticipates great advantages from the results likely to accrue from the connection which will be established through the College between men distinguished in the various departments of mathematical, physical, and chemical science, and those practical problems which so vitally interest the Navigator, the Naval Architect, and the Naval Engineer. The Board expects the College to become, not only an educational establishment affording the means of the highest training in theoretical subjects to Naval Officers of all classes, but also a nucleus of mathematical and mechanical science specially devoted to those branches of scientific investigation which have most interest for the Navy.”

It is sufficient that, on the whole, the system works well, and is producing excellent results among those for whom the College was more especially designed. But we have not heard of more than two or three officers of the merchant service availing themselves of its advantages.

But why should we not have a *Mercantile Marine College*? The establishment of such an institution has been a thought and hope of ours through long years. Surely the time must be ripe for its realisation, if the subject be pressed with a proper spirit and in the right quarter. Among the officers of the Merchant Service themselves the old vicious sneer against “scholarship” has

well nigh, if not wholly, died out; and we have good reason to believe that the project will be hailed with welcome by the large majority of nautical men,—the tendency being towards improvement as a class, with which follows as a matter of course improved position and standing, enabling them to speak on all subjects connected with their welfare and well-being with the voice of authority. Surely also there ought to be no lack of funds for the carrying out of such a project in a commercial country like ours which is so largely dependent on its shipping, and where influential and wealthy classes are so professedly interested in all that appertains to the merchant seaman. Government might also well be called upon to contribute its quota out of the thousands of pounds that are annually absorbed into the Mercantile Marine Fund.

Our chief desire is now to present an outline sketch, and not an elaborate programme, of the aim and intent of such a College. We would not wish to see it an institution designed solely for the instruction of youths whose aspirations lie in the direction of taking the position of officers in the merchant service, though this might eventually form part of such an establishment. It ought rather to be a College in which those who had already passed the required and legal term of sea-service should, before they enter on the responsible duties of their profession, pass through that elementary training which we are sorry to say thirty years of examinations have not developed, and which is still so often conspicuous by its absence. The time has passed when the best, if not the only, recommendation for an officer is that he knows how to handle a ship and set up rigging; these are undoubtedly important essentials, and can only be learnt at sea. But the groundwork of every other branch of the seaman's art can be better learnt on shore. Observation and the best of practice come later. There is scarcely a department of science with which a shipmaster's many duties may not be more or less connected; so with any responsible officer to whom a watch is entrusted. It is unfortunate that although such subjects are of considerably more value to them than to many other classes of society, the means afforded for their attaining that description of knowledge is far less than that which others

possess. The means and opportunity of obtaining a training and the higher education should no longer be wanting.

There would be no lack of students, for we feel sure a majority of young seamen would gladly avail themselves of the advantages offered by an educational institution of a kind superior to any now existing. It is therefore on this account, and from an additional view of promoting the social status of the merchant service, that we advocate the formation of a Mercantile Marine College. The mere preparation of candidates to pass an examination at a Local Marine Board would form but a minor portion of the education. The grand object would be to give elementary training which to raise a superstructure worthy the name of knowledge. Day and evening classes, conducted by competent teachers, should be opened for the purpose of imparting instruction alike to the lowest and highest capacities. The general courses of instruction should at first embrace English, arithmetic, mathematics, natural history, nautical astronomy, mechanics, maritime geography, chemistry, physics, geology, meteorology, magnetism and other experimental sciences, not however forgetting writing and drawing for those who require it. While once a week an able professor should give a lecture, illustrated by experiments, on some scientific subject in which the seamen are interested. The higher courses of instruction would come in due season.

Not the least important part of the College should be its library, which, while it contained every known work (English and foreign) relating to Naval Architecture, Nautical Astronomy, Navigation, Seamanship, and Shipping Law, ought to abound in scientific treatises as would be of special utility to the merchant officer in the efficient carrying out of his professional duties, and in commercial treatises serviceable to him in the transacting of the ships' business at home and abroad. These for his immediate and more pressing wants. But to such a library would necessarily be superadded, in due time and as opportunity offered, a library of reference and research—consisting more particularly of such old works as are mainly valuable in tracing the history of navigation and the seaman's art—not forgetful of the voyages of the early navigators, as illustrative of the progress of geographical discovery.

Nor could the library be considered complete without the adjunct of a good chart-room, into which all the latest publications, as issued from the press by the various Government hydrographic offices or by private firms, should find their way. Here, too, ought to be deposited, for ready reference, the latest "Sailing Directions," together with those useful bulletins known as "Notice to Mariners" and "Hydrographic Notices," issued from time to time by our own and foreign hydrographic offices; through these, current nautical knowledge is added to and improved, alterations and changes recorded, and errors corrected. The chart-room, under the superintendence of an able expert, should also be a repository of information respecting all the ports of the world—their trading capacities, the facilities offered to large and small ships, the port charges, harbour dues, general accommodation, custom and harbour regulations, &c.—in fact, everything relating thereto that owner, charterer, and shipmaster are, at the present time, obliged to hunt up from sources on which little reliance can be placed. To the shipmaster such a room would be an especial boon, from the comparative facility with which he could obtain any necessary intelligence on any required subject, up to the day of sailing.

There cannot be a question that a Mercantile Marine College is one of the requirements of the time, and most essential to the future well-being of the merchant service. Such an institution, established on a sound basis, and for the important purposes roughly indicated in this programme, would take rank with the colleges of the medical, legal, and engineering professions. Especially would it be the means of establishing an *esprit de corps* among the members which at present is so conspicuous by its absence; and under a changed system they would speak with the voice of authority. The value of the institution could not be estimated at the price it might cost, and, such being the case, it should receive without stint the patronage of the various Chambers of Commerce, of Shipowners, Lloyds', Underwriters, Shipmasters, and the public generally, who are all more or less interested in the efficient training, social standing, and welfare of those "who go down to the sea in ships, that do business in great waters."

THE INSTITUTION OF NAVAL ARCHITECTS.

THE Annual Meeting of the Institution of Naval Architects for 1881, was held on the 6th, 7th, and 8th, April, in the Hall of the Society of Arts, John Street, Adelphi. The president, the Earl of Ravensworth, filled the chair. In addressing the meeting he said that at no time before did so many questions of importance present themselves for consideration in connection with the Institution, and he proceeded to dwell at some length on the present commercial position of Great Britain in general, and of her shipping interests in particular. He found the Clyde held her honourable position at the head of the list, having built last year one-half more tonnage than she did in 1879, and 1879 was a very fairly active shipbuilding year all over the kingdom. The Wear built one-third more than in 1879; the Tees more than 50 per cent increase over 1879; the Tyne only built one-tenth more, and she actually built twenty-one vessels fewer, but she built upwards of 10,000 tons more shipping than in 1879. Now that was important because it showed that the efforts of our shipbuilders were directed to larger and more powerful, and consequently swifter vessels. The figures were as follows: The Clyde built, in 1879, 168,460 tons; in 1880 she built 209 vessels and 236,579 tons. The Tyne built, in 1879, 130 vessels and 139,843 tons; in 1880 she built 109 vessels only, but with 149,082 tons. The Wear built sixty-five vessels in 1879, and 92,176 tons; and in 1880 seventy-seven vessels, with 116,200 tons. The Tees built twenty-five vessels, with a tonnage of 31,750 tons and in 1880, thirty-eight vessels, with 48,506 tons; and the value of the vessels in the north-eastern ports, built last year amounted to seven millions of money. In February last there were building in the various shipbuilding establishments in this country no less than 650,000 tons of shipping under Lloyd's rules, and in addition to that there were 150,000 tons more not under Lloyd's qualification, making a total of not less than 800,000 tons of shipping in course of construction in February last. Our steam fleet had increased since 1850 from 1,350 vessels to 6,690 vessels, representing

ing 2,780,000 tons of shipping, or one million more tons than of all other steamships of the world put together. He was therefore justified in saying that we held a very fair position in the carrying trade. He knew that some high authorities thought that steel was the material for the future, both for our merchant and for our war vessels; but, at the same time, they must remember that price has a great deal to do with material, and the present price of steel would probably for some time to come be a serious impediment to its employment for the ordinary ship and rougher description of merchant vessels. But there were eminent authorities, and he was rather disposed to be with them, who considered that the days of iron for shipbuilding purposes were numbered. He wished to quote a fact from the chairman of the Cunard Company to show the advance in Cunard ocean steamers. He said that when the *Britannia* made her first voyage forty years ago she measured 1,139 tons, cargo capacity 225 tons, and she steamed $8\frac{1}{2}$ knots. Referring to the French bounty system he said that the French bounty upon the first cost of a vessel had been variously estimated to be very nearly one-fifth of the cost. Supposing a vessel to cost £50,000, the bounty would amount to something very near £12,000. But there was another branch of it. There was a bounty upon the navigation of the vessel amounting to $1\frac{1}{2}$ per registered ton per 1000 miles run on any direct line. Now that had been calculated to amount in one year to $17\frac{1}{2}$ per cent. upon the first cost of the vessel, and he would put the navigation bounty at $12\frac{1}{2}$ per cent. more upon the navigation, which amounted to no less a sum than 30 per cent. of the capital invested in that ship in one year. The effect of that appeared to him to be to put absolutely at least half that amount into the pocket of the shipowner in the shape of profit. We must look to greater care in the conduct of experiments upon designs in our shipbuilding establishments in order to bring ingenuity and theory to the test of practice. These were the objects and purposes of this Institution, and it is in the fulfilment of this great purpose that they would gain for themselves that to which he thought they were fairly entitled—the title, namely, of one of the most useful and practical institutions in the country.

The first paper read was

ON THE "ALMIRANTE BROWN" ARGENTINE, CASED CORVETTE, AND
THE EFFECT OF STEEL HULLS AND STEEL-FACED ARMOUR ON
FUTURE WAR-SHIPS.

By Mr. J. D'A. SAMUDA.

The author said that the *Almirante Brown* was he believed the first vessel afloat which had been constructed entirely of steel and coated with steel-faced armour, and he believed that a reference to her guns carried, the armour-resisting power obtained, and the great capability of steaming without recoaling, would show advantages beyond those possessed by any previous vessel of similar tonnage and power, results mainly due to the material employed in the construction of hull and armour. This is a vessel of moderate size combining all the latest improvements in construction, armour, and armament. The hull is built entirely of Siemens steel; the armour is "compound" or steel-faced, consisting of an armour belt extending 120 ft. in length, and protecting the engines, boilers, and magazines, with cross armoured bulkheads at ends of belt reaching from 4 ft. below the water-line to the main deck. Above the main deck amidships is an armour-plated battery with double embrasures at the fore end, and containing in all six guns. The armour-plates are worked on a teak backing, and are screwed to the skin with bolts and nuts from the inside, so arranged as not to wound the steel face of the armour. Horizontal armour of steel plates is worked from the battery to the ends of the vessel, forming a shell-proof and water-tight deck 4 ft. below the water, protecting the steering apparatus, &c. The bottom is covered with teak planking 3 in. thick, and zinc sheathing from keel to 3 ft. above the water, as a protection against fouling. This vessel is fitted with a double bottom, and divided by transverse bulkheads and steel decks into forty-eight water-tight compartments. The plating of the hull varies from $\frac{3}{8}$ in. to $\frac{1}{2}$ in. except behind the armour, where it is 1 in. thick. She has two pole masts, and an area of sail of 10,000 square feet. The armament consists of six Armstrong's improved type 8 in. 11 $\frac{1}{2}$ -ton long breech-loading guns fitted in battery, and so arranged as to give an all-round fire; one similar gun on upper deck forward and one

ft; also six $4\frac{1}{2}$ in. broadside guns on upper deck. Her machinery consists of two sets of inverted compound surface condensing engines of the collective indicated power of 4,500 horses—each set working its own screw, and being fitted in its own separate engine-room. The boilers are eight in number, cylindrical; the boiler-room being divided into four separate water-tight compartments. The steel-faced armour used, 9 in. thick, has been found in practice to be equal in shot resistance to iron armour of 12 in. thick, and to resist a shot from a 12-ton muzzle-loading gun at 10 yards; while the guns used in this vessel, though weighing each only $11\frac{1}{2}$ tons, are able to penetrate 18.3 in. of ordinary armour at 70 yards, and this is equal to the penetrating power of the service muzzle-loaders of 18 tons in weight. Five of the guns can be brought to act almost in a direct line ahead, while an all-round fire is obtainable in which nearly every gun can participate. The speed is expected to reach $13\frac{1}{4}$ knots, and the coal carried is sufficient to enable the vessel to steam at a low rate of speed—say 8 knots—6,000 miles, or at a speed of 10 knots to cover 4,800 miles of distance. The effect of substituting steel for iron in the hull, and steel-faced armour for iron armour, has been to obtain the same strength and resistance to shot that could have only been obtained in an iron vessel of similar size and strength with 510 tons additional material, and when increased in dimensions to meet this—as given below—a further 350 tons would be needed for the extra weight due to the enlarged hull. An iron-built and armoured vessel constructed to carry this additional weight, and of such extra dimensions as would be necessary if the same speed were to be maintained, draught of water preserved, and coal-carrying capacity maintained, would have to be increased in size, displacement, and power as follows. The iron ship would have to be constructed:—Length, 260 ft.; breadth, 55 ft.; displacement, 5,200 tons; coal to be carried, 720 tons; power, 5000 horses; while the steel vessel with steel-faced armour, as already described, would be:—Length, 240 ft.; breadth, 50 ft.; displacement, 4,200 tons; coal to be carried, 650 tons; power, 4,500 horses. It would involve 1000 tons additional displacement, and 500 additional horse-power,

to get in the iron ship equal speed and shot-resisting power, and she must carry 70 tons additional coal to enable her to travel an equal mileage without re-coaling.

In the discussion which followed, Sir John Hay said that a considerable number of small ironclads would prove very useful, and Mr. Samuda's design seemed to be very good. The *Almirante Brown* was not all armoured, but it must be borne in mind that at first no one thought of making an invulnerable ship—something just to keep out shells was all that was asked for. A great deal was to be gained by giving up part of a ship's armour, and this gain had been judiciously realised by Mr. Samuda. As for the gun in the bow intended to fire right ahead, he did not think this would be used with the other guns amidships firing also ahead, and their shot must go close past the gunners working the bow gun. As to the speed, he did not think $13\frac{1}{2}$ knots enough.

Admiral Sir Spencer Robinson congratulated the Institution on the success which had been achieved by its members in overcoming the defects of steel. Speed was of very great importance in ironclad ships; but coal-carrying capacity claimed quite as much attention.

Mr. Barnaby said that Mr. Samuda had, he feared, overrated the value of steel-faced armour. It was not one-third better than iron. The Admiralty experiment showed that it was about one-fourth stronger.

Sir E. J. Reed held that Mr. Samuda need not have made his ship so short, and blunt, and hard to drive. When armour on the bow and stern had been given up it was possible to use good lines. It was true that when a stout steel deck 4 ft. below the water-level was put into a ship it added as much to her weight as a good deal of bow and stern armour, but in the design before them the deck was only $1\frac{1}{2}$ in. thick. If the naval architect confined himself to a stout central citadel he might have a very easily driven ship. But he would like to know how much speed a ship with an unprotected bow would have after that bow had been injured by an enemy's shot or shell.

In replying on the discussion, Mr. Samuda explained that much of the design was settled by those for whom the ship had been

built. He fully anticipated a speed of 14 knots, which he thought would be very good, and the ship could steam 4000 miles at 10 knots without re-coaling—no insignificant performance. His statements concerning armour were based on information supplied to him by the makers of it, who said that, as a general result of trials, 9 in. of steel-faced armour were equal to 12 in. to 13 in. of iron armour; and besides, the steel armour always broke up the projectile, which was more than iron would do. As regarded injuries to the bow the ship was no worse off than many of the finest iron-clads in the world, such as the *Inflexible* and *Agamemnon*.

ON THE PECULIARITIES OF STEEL PLATES SUPPLIED FOR THE
BOILERS OF THE IMPERIAL RUSSIAN YACHT, LIVADIA.

By Mr. W. PARKER, Chief Engineer Surveyor of Lloyd's.

Mr. Parker began by calling attention to the steady increase in the employment of steel for boilers, and then went on to two points open to doubt, namely, the rate of corrosion of steel plates, and secondly, the chance of meeting with brittle plates. On the latter point he might state on his own experience, and on the authority of all the engineer surveyors of Lloyd's, that not one single instance of a brittle steel plate had come under their notice during the manipulation of 17,000 tons of steel; and it was not until the peculiar behaviour of the plates of the *Livadia's* boilers occurred that they had any fear on the score of brittle plates. During the construction of steel boilers much was heard of mysterious fractures in steel plates which had stood all the tests required, been rivetted up in their places, and had then, as it was termed, cracked without being touched. A great number of these cases had been investigated, and in every instance they had been clearly traceable to improper manipulation of the material, and the plates in the vicinity of the fracture were found to be perfectly ductile after the fracture had relieved the strain upon the material. These cases were quite as numerous in steel manufactured by the Siemens process as by the Bessemer process. They were clearly shown to be due to internal stresses set up in the plates by improper manipulation, and under certain conditions a tearing action was set up.

The fractures of the steel used in the boilers of the *Livadia* were entirely different from anything they had previously had experience of, and they had still later experience of other steel behaving in the same way, and he thought the time had come when steel makers must sift the matter to the bottom, and not only find the cause but find out the remedy. He then went on to say that he had obtained every facility for testing the plates of the boilers of the *Livadia* and obtaining other information concerning them. It appears that the plates were specified to be Messrs. Cammell's subcarburised steel, made by the Siemens process, each plate to have a tensile strength of not less than 26 and not more than 30 tons per square inch, with an ultimate elongation of 15 per cent. in a length of 6 in. In all there were 154 plates supplied, and from these 219 pieces were cut for bending tests; the cold bending and temper tests were made—and were nearly all satisfactory when made—from the rough shearings, and in those cases where the rough sheared pieces broke before bending to the required curve, duplicate test pieces were planed and properly prepared, when they all proved to be satisfactory. There were also fourteen tensile tests made at the works, the tensile strength varying between the limits of 26.1 and 28.3 tons per square inch, the elongation in 8 in. varying from 27.3 to 34.3 per cent. The tabulated results of these tests, supplied by Messrs. Elder and Co. and Messrs. Cammell and Co., are set forth in the tables. On the arrival of the plates at Glasgow, Messrs. Elder for their own satisfaction, had some check tests made, which practically corroborated those previously made at the steel works. The *Livadia*, it may be mentioned, was intended to be fitted with eight double-ended and two single-ended cylindrical boilers, each 14 ft. 3 in. diameter by 16 ft. long and 8 ft. 6 in. long respectively, constructed to work at a pressure of 70 lb. per square inch, the shells being of steel, and the internal portions of iron. The shells were $\frac{3}{4}$ in. thick, made in three courses of plating—lap jointed, treble-riveted in the longitudinal seams, and double-riveted in the circumferential seams and would be eligible, by the rules of Lloyd's Register, for determining the safe working pressure in marine boilers, to work at a pressure of 75 lb. per square inch. The

plates were all punched, the holes being about $\frac{1}{8}$ in. less diameter than that of the rivets, then slightly heated and bent to their required curvature, and afterwards put together and the rivet-holes rimed out fair to the finished size in place. While under this treatment one of the plates accidentally fell from the slings on to a piece of metal, which indented it considerably, but did not crack or injure it in the vicinity of the indentation, but it was observed that the plate had cracked at a number of the rivet holes. Messrs. Cammell were in consequence communicated with, and Mr. Alexander, their representative, who examined this plate, gave it as his opinion that the plates had all been injured by punching, and should be properly annealed to restore the material to its normal condition. Accordingly the plates were all sent to the makers' works at Sheffield, and annealed in a furnace which had been specially altered for this purpose. The plates were afterwards returned to Glasgow, and rivetted up in their places, and the boilers completed without any further cause for alarm. On subjecting the first boiler to hydraulic pressure, before the test pressure of 140 lb. per square inch was reached, the boiler shell tore asunder in three places, the cracks appearing to have started amongst the rivet holes of the longitudinal seams, and to have extended at the back of the rivet holes across the plate. In the second boiler, which it was intended to test, the shell plates were found to be cracked in a similar manner behind the rivet holes, before any water had been put into the boiler. Mr. Bryce, the manager of the engineering department of Messrs. Elder's works, at once gave instructions to cut the whole of the steel shells from these boilers, and they were replaced by others made of steel manufactured by the Steel Company of Scotland. These plates, which were worked in precisely the same manner, gave no special trouble in working, and the boilers proved to be satisfactory under test. On examination of the cracked or torn shell plates they were found to be extremely brittle; large pieces were easily broken by one blow from an ordinary sledge hammer. In other words, there was a material which had satisfactorily withstood all the mechanical tests recognised by Lloyd's Registry, the Admiralty, and the Board of Trade, as sufficient to determine its suitability

for the purpose for which it was being used, and was now shown to have become as brittle as cast iron, or even more so, after having apparently undergone only the working usual in boiler making. Chemical analysis was resorted to as being likely to throw some light on the subject, and the results did not show any reason why the material should behave in an anomalous manner. When the section of boiler shells was received in London, one of the fracture plates was separated from the other plates by carefully drilling out the rivets connecting them, and several strips were sawn out of the defective plate for testing purposes. Of these strips, two, each of 1 in., 1½ in., and 2 in. width respectively, were taken by Professor Kennedy, of University College, for tensile strength and elongation. The results seemed to be everything that could be desired, so far as tenacity and elongation are concerned; but the fractures appeared to be altogether different from those in good steel—distinct signs of lamination, peculiar colour, and crystallisation being entirely new features. Other strips, 4 in. wide were taken and subjected to bending tests. They were each found to be extremely brittle in proximity to the rivet holes, breaking across at the holes with one blow from the hammer, while but a short distance from the holes the strips bent to the same curvature as would be expected in ordinary boiler steel; and on one of the strips being raised to a white heat and allowed to cool, it was bent nearly close without any sign of fracture.

In order to ascertain the effect of punching on the material, several holes were punched in these strips, and without exception it was found that the strips immediately became as brittle as the material in the vicinity of the original holes in the boiler, one blow being in every case sufficient to break them across the break. Pieces 4 in., and no perceptible bending being produced before fracture. Pieces were taken then and holes punched therein; one piece was annealed after punching, in another the holes were rimmed out larger in diameter than the large side of the punched holes, and in a third piece the holes were drilled. In each case these strips bent to right angles across the holes without fracture. Six pieces were prepared from steel made by the Steel Compa-

Scotland, the Landore-Siemens Steel Company, and the Parkhead Steel Company, but in these cases the punching seemed scarcely to affect the bending capabilities of the material, the strips with punched holes bending to the same extent across the holes as the unpunched strips.

These experiments were afterwards corroborated by cutting off parts of the original joint of the plate from which the rivets had been drilled out, and striking each piece light blows with a hammer, which broke them easily into small pieces, but on the material from the same locality being annealed it was found to bend almost double even across the holes. A portion of the unpunched plate was also taken and holes punched in it of the same diameter and pitch as those in the boiler seam, and it behaved in a precisely similar manner. A piece of plate was annealed before the holes were punched; it was also nearly if not quite as brittle as the unannealed piece, and a further piece annealed after punching was found to bend well. The author then went on to describe other tests. It being thus found that punching holes in the plates made them extremely brittle, some specimens were prepared to ascertain the effect of that operation on the tensile strength of the material. A piece of plate was punched with two rows of holes and then sawn into strips, each strip containing two holes. In one strip the holes were rimmed out, another was annealed, and the third was plain punched. On being tested, the rimmed specimen broke at a stress of 27.6 tons per square inch, with an elongation in 8 in. of 7.5 per cent.; the annealed specimen stood 26.6 tons per square inch and stretched 6 per cent. in the same length; and the plain punched piece broke short off with no extension under a strain of 18.4 tons per square inch.

A narrow strip was cut from the plate next to that previously experimented upon, from a part of the plate remote from any of the rivet holes, and it was found to be extremely brittle. The fracture of this piece presented a very peculiar appearance. The outside sixteenth of an inch on one side presents mirror-like facets from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. wide, the rest of the fracture being of a fine granular, crystalline, but striated appearance. This outer layer was very soft, being easily nicked or cut on the edges by a penknife, and

it contained no carbon, while the layer immediately below this contained a little, the inside of the plate containing more.

All the other specimens that were tested for tension presented an entirely different appearance from those of steel that had worked well; some of the fractures were crystalline, whilst in the same fracture other portions were silky, others were filled with distinct laminations and cracks, and the colour of the fractures was quite different from the beautiful dark grey so marked in specimens of good steel. The peculiar appearance of the specimens suggested the idea that the plates might have been produced by rolling them from a slightly spongy ingot, the vacuities or air cells in which had been closed up during the operation of hammering and rolling, but the sides not perfectly united. It was also suggested that the plates might not have had sufficient mechanical work upon them, either by being cast in flat ingots and rolled direct into plates, or by cogging the ingots down to the thickness of the slabs instead of hammering them. Accordingly a piece cut from the fractured plate was raised to a red heat and rolled to half its original thickness. Strips were then cut from this $\frac{3}{8}$ in. plate and punched with holes $\frac{1}{2}$ in. diameter, being one half the size of those in the $\frac{3}{8}$ in. plate. This extra work on the material seemed to raise its ductility appreciably, the strips being found to bend well after punching, several of them bending to right angles and only one of them breaking short off, while none of them showed such extraordinary signs of brittleness as were observable in the material when of the original thickness.

The conclusions arrived at from this investigation may be summarised as follows:—(1.) That there is nothing in the chemical analysis of the material, beyond the want of uniformity described, to account for its behaving in an anomalous manner, and that, so far as can be discovered, the raw material used seems to be of a suitable quality. (2.) That the material as first rolled into plates stood the tests required by the specification, and also those prescribed by Lloyd's Register, the Admiralty, and the Board of Trade, the tensile stress, the elongation, and the bending tests being quite satisfactory. (3.) That the

strength of the material was not reduced by punching to a greater extent than is usual with mild steel, but that the plates when punched—whether one hole in a strip or several along the edge of the plate—became extremely brittle for a distance from the holes. (4.) That the appearance of the material, especially in those samples broken by tension, showed that the material had not had sufficient mechanical work bestowed on it, a number of minute laminations, cracks, and longitudinal defects being distinctly visible in the specimens; and this defect, together with punching, made the material entirely unfit for service. (5.) That further working of the material, to the extent required to reduce its thickness to one-half, appears to have early, or entirely, eliminated the cause of the brittleness. It is recommended, in order to avoid the use of similar plates in future, that the material of test pieces should be carefully observed, and should not be used when they present an unusual appearance, further bending tests should be made on strips having holes punched in them of a thickness of about $1\frac{1}{2}$ times the thickness of the plates.

On completing the foregoing investigations, and arriving at the conclusions set forth, it had been the author's duty, he said, to consult with his colleague, Mr. John, to inquire into another set of failures of plates, this time used for shipbuilding purposes. The material had been supplied to Messrs. W. Denny and Company, Dumbarton, by the West Cumberland Steel Company, Workington, and as some of the plates had fractured in a somewhat alarming manner, they were directed by the Committee of the Institution to investigate the subject. They were shown a set of these fractured plates at Messrs. Denny's yard, one below the water line, the other a plate from above the boss which supports the landing edge. A strip about $3\frac{1}{4}$ in. broad was taken from the latter, the strip being in the rough, sheared on one side and punched on the other. Being placed on an anvil, when struck with a hammer it broke off short. This plate was $\frac{1}{4}$ in. thick and broke at a tensile strength between 31 tons and 32 tons per square inch, with an elongation varying from 20 to 25 per cent. Having broken this strip off short with a hammer in its original position, the edges were planed down to remove those portions

injured by the punching and shearing, when it bent over to radius of $\frac{3}{8}$ in. without fracture. A $\frac{3}{8}$ in. hole was then punched the same piece, and after this it broke again short off with a blow from the hammer. It was evident from this that the material resembled in its defects the steel which failed in the *Livadia* boilers. The specimens were sent to the steel works, and Mr. Snelus frankly admitted that the material was not such as it should be, or such as he would knowingly have sent out from his works. No doubt the material was made by the Siemens process, the ingots were of a reasonable size, and were hammered down into slabs in the usual way. Further tests were made in duplicate, all tending to show that with more work on the plates they improved, and that this was the case in spite of great variations in the temperature during rolling. The experiments also showed that when the plates were so rolled down they did not break off short when it was attempted to bend them across punched holes. In fact they bent to a considerable angle before showing signs of fracture at the holes, which then opened gradually, instead of going suddenly right across. The author regretted to say that they had since heard of further failures of this material in the same way. How far the greater or less amount of work done on plates in reducing them from the ingots is accountable for the failures and peculiarities which have recently come to light, is a question of the utmost moment, and it is one which should be thoroughly investigated. Mr. Webb, of Crewe, laid it down some years ago that the ingot should be at least twenty times as thick as the plate to be produced from it, and he had doubtless sound reason and experience to guide him in his decision. Whether, however, an inch steel plate rolled from a 24 inch ingot would be in the same condition as a $\frac{1}{2}$ inch plate rolled from a 12 inch ingot is open to question. In more than one case during a recent visit to a number of steel works, the author had the pleasure to hear manufacturers express their perfect readiness to incur considerable expense in experiments rather than leave this question in its present unsettled state. The remarkable variation in the distribution of the carbon, phosphorus, and other constituent elements, was a point that must also be accounted for, and

true significance ascertained, and the testing should be of a more varied and elastic nature than at present. The appearance of the fractures should be carefully watched, and where any departures from the well-known silky fracture common to good mild steel appeared, the plates should be subjected to further bending tests on strips in their rough sheared condition, with holes punched in them, and in any other way that hereafter may be shown to be efficacious in discovering untrustworthy material.

In the discussion which followed, Mr. Kirk, of Messrs. John Elder and Co., said he had been asked by Mr. Parker to make some tests, and he had done so. The first thing which came out was that the plates would bear very little manipulation. A strip about a foot long, slightly bent, would not bear straightening cold by gentle pressure. It cracked at once; but, when heated and forged into a bar $\frac{5}{8}$ in. square, it was so much improved that the bar could be bent cold on itself; so he thought that the material was good, but the manufacture bad. He then took some Siemens-Martin plates, and tried to spoil them; he could injure them, but not make them as bad as the *Livadia* plates. Annealing might improve or spoil plates, according to how it was done. He showed a sample strip of the original metal bent cold on itself without crack. A second sample, equally good, had been left in a forge furnace for twelve hours, the damper being down, and the air excluded; the plate was uninjured. Two other samples heated in much the same way, but with the doors open and dampers up, so that a current of air passed through the furnace, were spoiled. A good plate could not be improved by annealing.

Mr. Thorncroft urged the desirability of uniform heating. The more work was put into steel the better. He used large quantities of thin steel— $\frac{3}{16}$ in., and it was usually tougher and better than thicker plates.

Dr. Siemens began by saying that the performance of the *Livadia* plates was so extraordinary, that he had asked for and obtained a sample for analysis. He could break the plates up with a hammer. The chemical composition was extremely irregular; and Mr. Parker had omitted all mention of one element, silicon, which was present to the extent of .03 per cent.

Phosphorus was twice as great in quantity on one side of the plate as on the other. How did that come about? Was the ingot all of the same metal? He was forced to conclude that the treatment which the ingot received greatly injured the metal. Mild steel should not be annealed. It ought to be able to bear punching without any loss of strength, and should not require annealing. On the contrary, it was well known that punching increased the tensile strength per square inch of mild steel. This material ought to stand any kind of rough treatment cold. If it was heated and forged in any way, however, it might be annealed with advantage. If the metal was weakened by punching it ought to be rejected. His experiments showed that whenever mild steel was squeezed in any way, as by the action of a punch, it became stronger. The annealing of steel plates ought to be done a plate at a time, not heaped on one another.

Mr. Denny said he had come to the conclusion that it was incumbent on himself and shipbuilders generally not to give orders to firms who supplied defective plates. This was the only way to compel steel makers to supply a trustworthy material; and he for one would never consent to take a plate from a firm which supplied untrustworthy metal. The steel makers must look to themselves. Working mild steel did not improve it. The plate referred to by Mr. Parker had been cotted up, and the next morning was found broken. Thin steel— $\frac{1}{16}$ in. from the Cumberland Company's works stood splendidly. This opened his eyes to the fact that thin steel behaved differently from thick steel. In future, tests ought to be increased in severity.

Mr. West said: They would have to be content with punched holes for ships, and he was of opinion that punching did not injure good steel in one sense. He had also found that if a strip of Bessemer steel were bent at right angles, and then straightened, its tensile strength would be augmented. He feared that in the case of the *Livadia* the original tests had been perfunctory. As for annealing the plates after they had cracked, it was locking the stable door after the horse had been stolen. A 22 in. ingot was quite large enough to make a $\frac{7}{8}$ in. plate out of.

Mr. Samuda had heard Dr. Siemens with some astonishment

Every now and then they came across a hard plate, and annealing made it soft and ductile; but as a general rule he did not think annealing should be practised unless the plate had been heated in one corner or somewhere. Questions of price should not be allowed to affect the quality of steel.

Mr. Martell said: There was a mystery about mild steel which there was not about iron. The size of the ingot had a great influence. One steel manufacturer had tried to roll plates out of steel slabs, and had entirely failed. Mr. Webb, of Crewe, a man of great experience, said he could not get a sound plate from an ingot less than 24 in. square. That was an important statement. He could not restrain the expression of his astonishment at Dr. Siemens' assertion that punching did not weaken steel; it was contrary to all experience. Steel makers must not delude themselves by testing planed and filed samples, but rough samples, showing how the metal was handled in the shipyard.

Sir Spencer Robinson said that he was surprised by Dr. Siemens' statements; all his own experience was that annealing restored the strength to punched plates.

Mr. E. A. Cowper criticised the construction of the annealing oven.

Mr. Merrifield said that all his experience went to show that before a good tough plate could be got the original texture or structure of the ingot must be entirely broken down. This was true of wax, lead, copper, and steel.

Mr. White cited a case in which the manufacturer of some 2 in. deck armour plates tried to roll them from cast steel slabs without success. A plate might be worked too much. He had met with brittle $\frac{1}{8}$ plates, which were made tough by annealing. Beams as much as 65 ft. long, rolled in one piece, were sometimes found to be brittle at one end. He had every confidence in steel, but the makers must be cautious. Punching injured steel, notwithstanding Dr. Siemens' assertions to the contrary. 28-ton steel became 27-ton or even 26-ton steel after punching. Tests now made were not rough and severe enough.

Mr. Jameson stated that the ordinary practice when he was at Messrs. Elder and Co.'s works was when steel plates for boilers

came in after they had been tested at the works, to re-test them. They were then punched and subsequently planed, at the sides and ends, then annealed, and afterwards bent in the rolls and cooled down in the shops. The plates of the *Livadia* boilers had behaved differently from other plates, and he wanted steel maker to tell him why.

Mr. Pearce said that Dr. Siemens' assertions were contrary to all experience, and he could not accept them. Punching injured steel, and they must anneal after punching. All boiler plates ought to be drilled, and Messrs. Elder now did so treat their boiler plates. For every steel plate which had failed it should be remarked that twenty iron plates had done the same.

Mr. John, in the absence of Mr. Parker, stated that the plate which gave way at Mr. Denny's was Siemens-Martin steel. Tests should be on rough, not on planed plates. There was a great deal about steel yet to be learned.

TWENTY MINUTES ON THE INCREASED USE OF STEEL IN SHIPBUILDING AND MARINE ENGINEERING.

(By Mr. JOHN R. RAVENHILL.)

Steel as a material for the hulls of moderate-sized vessels although of a very different description to that now in use, was successfully adopted in the commercial marine in the year 1859. The *Jason*, of 452 tons O.M., was built by Messrs. Samuel Brothers for service in the Black Sea, and in 1860 the well-known Dover Mail Packets were constructed for the London, Chatham and Dover Railway Company. Steel for the construction of marine boilers was first used by the Admiralty in 1857, the plates for them being manufactured by Messrs. Shortridge, Howell, and Jessop, but the results were far from satisfactory. Steel boilers were about the same time introduced into the commercial marine, but with very conflicting results, although it was right, perhaps, to say that there are land boilers now working at high-pressure that were made of steel under the Bessemer process, about the same date, which have given and are giving every satisfaction. As regards the above-named steamers, they fully justified the anticipations of those who advised their owners to adopt a then quite new mater-

and no vessel could have have undergone a severer test as regards strength of material than the *Samphire* did within a very short time of her being afloat ; but the great cost of the production of the material militated against its becoming more generally introduced, notwithstanding the successful results obtained. The shafting on board the *Samphire* was made of puddled steel by Messrs. Thomas Firth and Son, the diameter of shaft necks being 10 in. The improvements introduced since that date in the Bessemer process, coupled with the introduction of the Siemens-Martin principle, had entirely changed the aspect as regards the future use of steel-plates. They were first used by the Admiralty for inboard work on board the *Bellerophon* in 1863.

Crank axles of the same description of puddled steel, by the same makers previously alluded to as having supplied the shafts for the *Samphire*, gave every satisfaction on board many vessels from the author's experience, but they were then only in the position to manufacture them up to a comparatively small size for marine work, and the sad disappointment that attended the fitting of three large crank shafts on board some celebrated mail packets that were supplied by a celebrated foreign establishment, together with failure in one or two other instances, retarded the further introduction of them on board steamers ; but great progress has since been made in the material used for shafting. Whitworth's fluid pressed steel for propeller shafting is well known, and his firm has lately been engaged in making crank shafts, the plan adopted being as follows :—The hollow crank pin is cast in one piece with the blades ; each piece of the body of the shaft is then screwed securely into its respective blade, with a key carefully fitted as an additional security, and this plan has found favour with some very eminent engineering firms, and it has been used by the Admiralty. On the other hand, Messrs. Vickers and Co., of Sheffield, have done a good deal in cast steel crank shafts, but having regard to the old meaning of the word cast steel, the words malleable cast steel would, perhaps, be a more correct definition, as they all pass under the forge hammer after leaving the foundry. From personal inspection of a large crank shaft, having a coupling on the end of about 3 ft. 6 in. in diameter, he could state

that over the whole of this large surface, as also of all the surfaces of its blades and crank pin, the metal showed a striking similarity of colour and uniformity of appearance, and they were clean and bright as a looking-glass; very different as regards the inside portions of the crank, from the large crank shafts before alluded to, which showed a very crystalline appearance at their centre. They have forged, in some instances, in one solid piece, in other cases they have adopted the plan largely followed in the North by marine engineers, in building up large wrought iron crank shafts.

Messrs. Vickers and Co., of Sheffield, were the first firm in this country to cast steel bells, and about eleven years ago they turned their attention to the production of cast steel blades for propellers. The *Iron Duke*, armour-plated, of 6,010—3,787—tons, and 4,270 twin screw—800—horse-power, was one of the first vessels to which they were applied, and they have given during successive commissions the most perfect satisfaction, and are still in good condition. A large number of our commercial steamers have also been successfully fitted with propellers of this material, more especially in the Transatlantic service, where they have been found to be greatly superior to the cast iron ones previously in use; but such is the severity of the work done, that at the end of about three years the blades become so reduced in thickness that they require to be replaced. This same firm have also supplied some steel liners for cylinders for the commercial marine.

The present vast and increasing use of steel is really startling. The number and tonnage of steel vessels, steam and sailing, classed in Lloyd's Register during the years 1878, 1879, and 1880, are as under:—

	Steam.		Sailing.	
	No. of vessels.	Tons.	No. of vessels.	Tons.
1878	5	2,929	None.	—
1879	6	12,473	1	1,700
1880	17	27,815	1	1,245

number and tonnage of steam vessels, which, from the inventory in possession of their office, made up to the 31st December last, appeared to be in course of construction—for they do not come under their survey—were thirty-four steam vessels, 1,760 tons; two sailing vessels, 1,760 tons; as to which the author may mention that the Orient Company, the Peninsular Company, the Union Steamship Company, and others, are all building vessels of steel. As regards boilers, in the spring of 1878 only one steel boiler had come under the notice of Lloyd's since the introduction of mild steel. From that date the number of steamships fitted with boilers, either wholly or partially of steel, by returns also up to 31st December last, were as

	No. of Steam Vessels.	No. of Tons of Steel worked up.
1st May, 1878, and 30th April, 1879	120	about 3,000
1st May, 1879, and 30th April, 1880	160	„ 4,000
1st May and 31st December, 1880	250	„ 7,500
	530	„ 14,500

it is remembered that these figures date back barely for they become very significant.

The engines of the *Leander*, now being constructed by Messrs. and Sons, are to indicate 5000-horse power; somewhat in those of the *Audacious* class, but the large piston of the same diameter, the comparison is interesting. If the difference in weights to be correct, there is a saving in favour of the *Leander* pistons of no less than 36 per cent valuable as applied to one of the principal moving parts in a vessel travelling at a speed of 720 ft. per minute, the engines work 100 revolutions. Such a saving as 36 per cent. would amount to 150 tons in one of our large sets of commercial engines, provided the same percentage could be carried

throughout, whilst a considerable saving by the substitution of this metal for wrought iron could be, in his opinion, beneficially effected.

The discussion was opened by Mr. Denny, who drew attention to the important question of the corrosion of steel. Last year he had had the honour of bringing before the members of the Institute the case of two screw-steamers built by his firm, and which were employed in the brackish waters of the Irrawaddy. They were built of Siemens-Martin steel, and he was happy to tell them, as bearing upon the discussion, that both vessels had been inspected and no corrosion had been found after twelve months' service. In the spring of last year they delivered to the Peninsular and Oriental Company a steel screw-steamer, the *Ravenna*, which was built entirely of steel, with the exception of the stern frame and the rudder frame, which were of forged scrap iron. The week before last he inspected the vessel in dock and found the skin, both above and below the water-line, perfectly sound and free from corrosion, but the rudder frame was most seriously pitted, to the depth of over three-sixteenths of an inch. He thought this a very extraordinary result, and well worthy the attention of the Institute, because it seemed to him to go to prove that it was rather a dangerous thing to mix up iron with steel. It seemed to him a curious thing that the water flowing from the skin of the ship should attack by preference the iron plates.

Mr. Wright stated that since steel had been introduced for the purpose of cylinder liners in the Admiralty service, there had been no fractures to give them any trouble.

Mr. Samuda said that cast steel was now being largely used in many useful parts of the engine, and he felt confident that if they could almost entirely remove cast iron, and substitute steel, they would effect a considerable improvement both in work and material.

Mr. Martell stated that at Lloyd's they had admitted steel for various purposes for some time. As regarded corrosion, his experiences had been precisely the reverse of those of Mr. Denny. He had recently seen a steel-built vessel on the slipway under repairs after she had been running for some time, and whilst the

rivets appeared to be quite sound, the steel plates at the bolt-heads were quite corroded.

ON THE STABILITY OF CERTAIN MERCHANT SHIPS.

By MR. W. H. WHITE.

This paper gave the results of a series of calculations made at the Naval College from data furnished by drawings of several typical merchant ships, and by inclining experiments made there-with by the builders for the purpose of ascertaining the vertical positions of the centres of gravity of those ships in a completed state. From data thus obtained estimates were made of the vertical position of the centres of gravity corresponding to various conditions of loading. From the information thus furnished a number of metacentric and stability curves were constructed. Several of these curves were given in the paper, and the author explained their use in affording comparisons between naval and merchant ships, and showing the relative changes of position of the metacentre and centre of buoyancy with change of centre of gravity consequent on loss or movement of cargo or consumption of coal. He explained that with many long, narrow, and deep merchant ships the greatest care had to be taken when unloading a cargo, coal being taken in as the vessel becomes light. Reference was made to the use of water ballast in order to make up for the stiffness lost by removal of cargo and coal. It was pointed out, however, that "there seems good reason for thinking that extreme narrowness in proportion to length and draught does not promote economy of steam power; and the movement in favour of greater proportionate beam which is now taking place will have the effect of increasing the initial stability of merchant steamers in the light condition." The experiments of the late Mr. Froude were quoted as showing that with a constant length, draught, and displacement, the extreme breadth of a ship may be increased from a little over one-tenth the length to a little over one-eighth of the length, without increasing the resistance at moderate speeds, and with a decrease in resistance at high speeds. The fineing of the ends of the vessel, and the rounding out of the water lines at midships which always accompanies this change of form of the

JAPANESE MERCANTILE MARINE.

DURING the fiscal year ended June 30th, 1880, the total number of applicants for masters', mates', and engineers' certificates was 1,245; of these 888 obtained certificates, whilst the remaining 407 failed to pass the required examination. Of those who obtained certificates, 720 were Japanese, and 118 foreigners; whilst of those who failed, 298 were Japanese, and 109 foreigners.

The total number of masters, mates, and engineers possessing certificates of the various grades, for their respective capacities, during the fiscal year, was 1,419. Of these, 1,190 were Japanese, and 225 foreigners.

Licenses to pilot vessels of foreign form of construction were granted to 2 Japanese and 4 foreigners; and the licenses of 1 Japanese and 14 foreigners were renewed; making a total of 21 licensed pilots.

The number of certificates of registry issued to vessels of foreign form of construction was 261. Of these, 85 granted to steam-vessels and 118 to sailing-vessels were original certificates, whilst 63 to steam and 50 to sailing-vessels were renewals. The number of certificates of registry given up on account of the losses of the vessels to which they had been issued, or from other causes, was 25, of which 10 were from steam and 15 from sailing-vessels.

The International Code of Signals was issued to 63 steam and 149 sailing-vessels, and returned from 15 steam and 9 sailing-vessels.

The number of vessels of foreign form of construction wrecked or missing (including one foreign-owned vessel) during the year ended December 31st, 1879, was 30, and the number of persons drowned, injured, or missing from these vessels was 40. The number of vessels of home form of construction, of above 50 tons capacity, wrecked or missing during the same period was 375, and the number of persons drowned, injured, or missing from these was 68.

Since the "General Regulations for the Engagement and Exa-

mination of Masters, Mates, and Engineers" came into force, viz from the 8th August, 1879, five official investigations were held up to the end of the fiscal year, to inquire into the circumstances connected with loss, collision of, or damage to, vessels of foreign form of construction. In one case, a first mate's certificate of competency (held by a foreigner) was suspended for a period of six months, a temporary certificate as second mate being granted him during that time. In another case, an engineer's "Certificate for Small Steamers" was cancelled.

Since the opening of the Tokio Marine Insurance Company (Hoken Kwaisha) on the 8th August, 1879, 116 vessels were, at the end of the fiscal year, on the application of that company, inspected at Shinagawa and Yokohama by inspectors from the Marine Office. Of this number 46 had been constructed in this country and 70 were foreign-built vessels. Of the former 3 were found to be good insurance risks, and of the latter 55.

Under the "Regulations for the Engagement and Discharge of Seamen," the number of "Forms of Agreement for Seamen" issued from the various shipping offices was 2,940, and the number of "Forms of Certificate of Discharge" 9,242. As the certificates of discharge give the character of the seaman for ability, as well as for conduct, they enable employers to select good and steady men; and, on the other hand, the system tends to stimulate the seamen in the performance of their duties, in the hope that, on the expiration of their term of service, they may obtain good certificates of discharge.

During the past year permission to manufacture signal lights was granted to one person. The total number of persons to whom such permission has been granted up to the present time is 22.

The total number of persons rescued from shipwreck, or whose lives were saved at sea, was 981, and the number of persons who assisted in saving the above was 2,252. Yen 1,005 have been given as a reward for such services.

The number of students admitted to the Marine School of the Mitsu Bishi Mail Steamship Company during the year ended the 31st day of the 12th month, 12th year of Meiji, was 8 for the full course, and 26 for the short course; making with the old students

a total of 128. Of these 6 were sent abroad, and are still absent, 44 are studying practical navigation at sea, 3 engineering in the iron works at Shanghai, 5 in the Mitsu Bishi Company's iron works at Yokobama, and 70 are in attendance at the school. Besides these, 6 others completed their full course, of whom 3 have already obtained certificates as second mate, and the remainder received appointments as teachers in the same school.

At the Marine Schools of Osaka and Hakodate, the number of students is from time to time increasing.

CORRESPONDENCE.

MEDICAL ATTENDANCE ON BOARD SHIP.

To the Editor of the "Nautical Magazine."

SIR,—In my first communication (January 1, 1881) I alluded to the necessity of making further provision for medical attendance on board ship. I pointed out that the mere question of numbers cannot be justly considered as an index of this necessity, but rather the destination of the vessel, the mode of propulsion, and, I may say, the duration of the voyage. There are, doubtless, many who deny both the practicability and the necessity of this, but there should be no question at all where passengers are concerned. I would yield to none, in my opinion, as to the *advisability* of every ocean-going steamer carrying a surgeon. I trust there are few who would gainsay the statement that every ocean-going *passenger* steamer should do so.

The interpretation of this very term opens up a very large and a very serious question. The Act of Parliament defines a "passenger" practically as a steerage passenger, a "passenger ship" as one carrying more than fifty passengers. This distinction is both invidious and unjust. Why the *number* and the *quality* of people carried on board ship should be made the index of the necessity or not of certain provisions I, for one, fail to

apprehend. The necessity, as regards the individual, of making suitable provision for his welfare and comfort, and of seeing that these provisions are fulfilled, is as great whether there is one passenger on board a ship or a hundred.

Contrast for a moment a somewhat similar case ashore. Is not a fact that no matter how many people there may be in a railway train or in a public conveyance of any description, the same laws relating to their comfort, their convenience, and their welfare, have to be complied with ?

It is, moreover, clear that such definitions place the shipowner who does a small business at a most unjustifiable advantage as compared with his more fortunate competitor who does a large one, and the public at large who patronize his vessels, either from choice or from necessity, as well as his employées, at a corresponding disadvantage. Is not a cabin passenger entitled to the same amount of consideration as a steerage passenger, and any member of the crew to as much as either, at least so far as regards the protection of life and property ?

The present Act of Parliament relating to the carriage of passengers by sea is old, if not antiquated, and the times demand an improvement. Every ship should be periodically inspected by a properly qualified sanitary officer.

The condition of the seafaring man, the condition of those who travel by water, is as much entitled to consideration as is that of those ashore, if not more so ; for, when a man is "in a boat," he cannot always get out of it, and is thus deprived of the privilege that every one possesses ashore, viz., that, if he does not like it, he can leave it.

It may be argued that the time when foreign governments are giving bounties is not the time to talk of these things. I say, on the other hand, it is the time of all others to do so. If the pride or the strength of Britain on the ocean is to be maintained, it must be done by improving the condition of the men as well as that of the ships. Is this a time to pursue a policy of "laissez faire," to restrict, for example, the Contagious Diseases Acts from extending their salutary influence to the towns frequented by the Mercantile Marine, as much as in those frequented by certain of the

and naval establishments, or to withhold from one man give another ?

wish to maintain our position, we should do what lies to improve ourselves and make us more worthy of it, in competition should rather increase our anxiety to do the reverse. If the employer of labour could see far ahead, he would see that his own interests are tied and bound to the interests of those that he employs, and that in improving their position he would improve his own. Great improvements have been made of late in the condition of those on shore ; opportunity is not wanting of improving the condition of those at sea ; they are not, indeed, so numerous, nor so influential, politically speaking, as a class, but they are no less deserving of consideration on that account. We want to see, as we most assuredly shall, the same consideration as to the protection of life and property enforced in the case of the collier as in that of the largest mail steamer. We want the same liability involved in the case of disease, and even death, as is involved in the damage or the destruction of property, and we want to see the same conditions enforced as to the safety in the case of units as in that of hundreds or thousands of men.

I am, Sir, yours faithfully,

A SEAFARING MAN.

1881.

ICEBERGS.

To the Editor of the "Nautical Magazine."

My apologies for addressing you are twofold—first, as the captain of an Atlantic mail steamer, and the person particularly responsible for the safety of hundreds of human lives on the voyage that I undertake, and also of the material interests which the steamship that I command represent ; likewise being so much more qualified as the possessor of nautical skill and experience at sea, to have some knowledge of the subjects I now seek to call your attention ; secondly, I am im-

pressed by the existence of a special danger at sea, which I humbly think her Majesty's Government may be induced to do something to lessen.

The course of a great iceberg from the time of its starting on its career in the North, to the time of its supposed dissolution in Southern waters, is by no means clearly written yet; and in these days, when the chance of throwing the light of science on obstacles in the way of progress is taken up with such avidity, and pursued with such steady devotion through so many difficulties, it appears strange to me and my brother commanders that the attention of scientists, and even of philanthropists, has not been directed to collect some positive information concerning the track and career of icebergs in the North Atlantic.

Icebergs during the season of 1880 were unusually numerous, and no great surprise need have been felt at hearing of an accident by collision with some of them; the wonder is, that catastrophes were not of more frequent occurrence, considering the great number of vessels that are continually crossing their track, which track unfortunately lies in a region where fogs are notoriously prevalent; steam-whistles may be heard, and stationary dangers may be avoided, but the much-dreaded ghostly-looking iceberg is as silent as a tombstone, and like that emblem, death reigns in its vicinity; the sorely-beset navigator, with his heart in his mouth, prays for a deliverance from the wall of ice that his fancy fears may be in his track, and which he is conscious that his own watchfulness or that of his officers may be unable to avoid. To stop his ship entirely at such times would be the safest course, but taking into account the protracted duration of these fogs, even those companies who discountenance taking risks, and whose principle is to subordinate everything to safety, may well hesitate before instructing their commanders to adopt such an alternative. Supposing they give such a command, where are the passengers impatient to reach their destination, who would not withdraw their patronage from a line which ventured upon the experiment of being so very cautious? But to every thoughtful sailor who has considered these two o'ertopping dangers of Atlantic navigation—Fog and Ice—the prospect of escape from them is not altogether

dark or hopeless. The electric light, and other devices for signalling in fog, are bidding fair to lessen danger from that cause, and the heart's best wishes of every navigator are with the scientific men who are now exerting their skill to achieve success in this direction. The danger of ice still keeps mastery of the field, and the whole purport of this letter is to point out a way by which that danger would be, to say the least, mitigated. What we want, is a memoir of one or more icebergs during their isolated career above water, written, say by the commander of one of her Majesty's gunboats, detailed with his vessel for this special service. Apart from the record being of priceless value and very interesting to the navigator,—in so far as he would have some enlightenment as to where an iceberg, which had been seen in a certain position on a certain date, might be avoided,—ships' reports, signalling, &c., would then become of some value, which hitherto have been useless for all practical purposes. To follow one of these immense masses of ice from the far north to the sunny south, daily chronicling its course and diminution of size, would be no mean service for a Government vessel to engage in. It should be recommended to her officers and crew by the thought that their labours tended to the preservation, not the destruction of life. They would be cheered by the noble precedent of Arctic voyages undertaken in years past to solve the enigma of the North-West passage, more recently by the voyage of the *Challenger* on purely scientific discovery, and stimulated by the melancholy reflection that the *Atalanta* may have met her fate by encountering an iceberg.

Were a gunboat to be detailed as I have suggested, it would be interesting to discover the effects of shot, shell, dynamite, or torpedoes upon the masses of ice. I am inclined to think that the effects would be to shatter them and hasten their dissolution—a very desirable thing to do, when they happen to lie in the highway of ocean travel. Possibly the dispensers of Government money will consider the latter suggestion rather a Quixotic one; it may be so, although I have a conviction that the British taxpayer is often called upon to open his pocket to more speculative and less laudable enterprises. If we could only arouse to this subject a

part of the enthusiasm which was accorded to Mr. Plimsoll's agitation, I venture to predict that the public would receive a more direct and gratifying reward in return for their display of feeling, from the fact that the phenomenon to be dealt with is less complicated, would not interfere with class interests, consequently no factious criticisms would be called into activity. Our American cousins show a keen appreciation for utilitarian enterprises, and there is no reason why the one I propose should not be taken up, either by the Government or some public spirited man in their country who could afford the cost, irrespective of the glory shed on their flag in humanity's cause; it has a strong claim upon their notice, from the fact that it directly bears upon the comfort and safety of the great and growing personal intercourse between Europe and America.

On a memorable occasion valuable time was spent while we were bickering about ways and means to accomplish an urgent public duty; two American gentlemen generously and bravely undertook to do the work, and their noble efforts were crowned with complete and well-deserved success. I allude to the finding of Livingstone.

There is a general but erroneous impression among landmen that seafaring men do not fully realise the dangers to which their calling exposes them, but my thirty years' experience has shown me that we never fail to be quite alive to our plight when facing real dangers, and I now, as the representative of a nautical experience in these troubled waters, aver that I never begin a voyage across them without a fervent aspiration, that I may once more elude these special dangers that lie ahead of me, or close the voyage when I have escaped catastrophe without a prayer of thankfulness.

For the unprofessional reader, it may not be out of place or superfluous here to state, that neither the air nor water temperature gives the slightest help to the navigator in indicating the neighbourhood of ice, except perhaps when there is a fresh breeze blowing directly over it, and in a line with the ship, or a change of water temperature crossing its wake; but in the passages to and from America it is usual to cross their track on nearly a right

angle, consequently, this last small factor as a guide to its whereabouts is lost to us.

In the early part of last July we passed within three miles of an iceberg with temperature air 63 water 61 in the latter part of the same month, 120 miles north, and 100 miles east of the former position, passed quite close to an iceberg with a steady temperature of air 64, water 60.

I have already trespassed too long upon your columns, and yet, I close with a half sad feeling that my feeble expression has done but small service to the burning question that is so intensely felt by my brother sailors, but the weak contribution in their service yields a ray of hope, that it may serve to stimulate more doughty warriors of the pen to enlist in the cause.

Soliciting in the interests of my profession the publication of this letter in your potential columns,

Believe me, Sir, respectfully yours,

HORATIO McKAY.

Liverpool, April 2nd, 1881.

THE IDENTIFICATION OF LIGHTHOUSES AT NIGHT.

To the Editor of the "Nautical Magazine."

SIR,—There is an old adage, "Save me from my friends," and most certainly seamen will rejoice if they are saved from the wild lighthouse theory of Sir W. Thomson. It excites astonishment when we read that one so learned and practical should advocate a system which, if carried into effect, must upset the ideas of the whole of the seamen of this generation, without a hope that the new could ever supply their place. Does Sir William imagine that the masters of our deeply-laden ships can, during a gale, stand calmly, stop-watch in hand, and note the time of eclipse of any particular light at a period when hatches are battened down, seas breaking aboard, and wave crests frequently obscuring the horizon and the lighthouse. If such be the case, he will act wisely in making a few winter passages around the west coast of Ireland in a sailing coaster. It is the exception, not the rule, to find a time-piece of any description on board of these small craft, and how in

their case the innovation would answer is indeed difficult to comprehend.

In exceptionally heavy weather, even when running for the magnificent light on the Fastnet, I have never been satisfied without two or more timings. In addition to the causes which are named above, the vision of many men is not sufficiently trustworthy to enable them to decide with confidence when the periods are so short that a shower of rain, hail, or snow easily breaks the chain of their observations; and yet, according to the proposed innovation, periods of a second and fractions of a second would have to be appreciated by the many illiterate seamen and fishermen of the coast. Already the theoretical element enters rather too largely into our system of lighthouses, resulting occasionally in disasters. The proper judges of lights, other things being equal, should be the men that necessity compels to steer for them under every condition of weather. This simple law is too often neglected in much that appertains to the seafaring population, as if they alone were unable to appreciate the particular regulations which best suited their case.

Sir W. Thomson has the gratitude of seamen for the invention of his exquisite lead and compass, and it is to be regretted that he should attempt to mar the fame so justly acquired by riding an impracticable hobby. Supposing that legislature were so weak as to carry out his proposition, the coasts of the United Kingdom would quickly be strewn with wrecks and dead men's bones.

April 7th, 1881.

W.

ADMIRALTY CHART OF THE MEDITERRANEAN.

To the Editor of the "Nautical Magazine."

SIR, —I send you a few notes relative to the chart with which I am navigating this sea, in the hopes that they may be found of some use to seamen, and may draw the attention of the Admiralty to its faults.

It is, on the whole, a splendid chart (in two sheets, Nos. 2158 (a) and (b)) of the entire Mediterranean; but for anyone going direct through from Gibraltar to Malta and Port Said, its useful-

ness is very much marred by the fact that the degrees of latitude from 35° to 37° in the Western sheet, and from 33° to 37° in the Eastern sheet, are not divided, so that to mark off the latitude anywhere in the track which all steamships take going to the east, one has to either take the divisions of a greater or less latitude (neither of which are correct for the purpose) or mark in the divisions by hand, which is a trouble that I submit ought not to be incurred by the mariner who buys a new chart. The same omission renders it difficult to measure distances with the dividers, and though it is very praiseworthy of the compilers to insert the entrance to the Straits of Gibraltar and the coast of Syria, surely the inner edges might have been divided, between these special latitudes, or the chart extended. An intermediate parallel of latitude would also be, I suggest, a great improvement. Personally, I like the compasses being all true, but I protest that it should be very plainly indicated on each compass on the chart; for of all my charts (quite new throughout) these are the only ones with a true compass! Even my smaller scale of the Mediterranean has magnetic compasses marked on it, and on coming from either the Atlantic or the Red Sea, with the use of the magnetic compass, and in an hour passing into the use of the true, is very likely to mislead. I think that any practical seaman will agree with me, that such an important thing ought not to be left to the acuteness of the sailor, who may have been up half the night, and, by laying off his course, as he has just been doing on another chart, may lose his ship. I consider it essential that all charts with true compasses should plainly state on each compass that it is true.

This otherwise admirable chart is spoilt by these simple omissions, and I do hope in the interests of nautical men that in future publications such drawbacks may not continue.

Apologising for troubling you,

I am, dear Sir, yours faithfully,

W. E. H.

Mediterranean Sea, March 20, 1881.

TIDE TABLES FOR MAY, 1881.

Also Ports of Reference for the Constants in the next Table.

WEEK DAY.	MONTH.	LONDON BRIDGE.		HULL.		NORTH SHIELDS.		LEITH.		DEVON- PORT.		DOVER.		WESTON- SUPER- MARE.		LIVER- POOL.		GREEN- OCK.		QUEENS- TOWN.		KINGS- TOWN.		LONDON- DERRY.		BREAST.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
M	1	3 20	3 47	8 1	8 19	4 54	5 13	9 48	4 7	7 8	7 24	0 31	0 51	8 24	8 41	0 34	0 52	1 23	1 41	6 34	6 52	0 22	0 41	9 25	9 42	5 15	5 33
M	2	4 13	4 26	8 57	9 3	5 32	5 51	4 26	4 40	7 56	1 1	1 31	1 51	8 38	9 15	1 10	1 28	1 59	2 17	7 28	7 46	1 0	1 20	10 19	10 36	5 51	6 9
W	3	5 19	5 40	9 55	10 15	6 51	7 14	5 47	6 9	8 45	2 3	2 51	3 10	9 12	9 40	2 32	2 50	3 12	3 32	8 44	9 21	2 43	3 11	11 27	11 44	6 26	6 45
W	4	6 23	6 45	10 40	11 1	7 39	8 6	6 34	7 3	9 37	3 13	3 31	3 50	10 43	11 7	3 6	3 24	3 46	4 6	9 33	10 10	3 38	4 6	12 31	12 48	7 9	7 28
F	5	7 26	7 48	11 11	11 23	8 40	9 14	7 35	8 24	10 20	4 2	4 38	4 57	11 35	11 38	4 0	4 28	4 47	5 13	10 20	10 47	4 4	4 38	1 10	1 49	8 58	9 26
S	6	8 28	8 50	12 1	12 13	9 40	10 14	8 36	9 25	11 23	mid.	5 45	6 24	0 6	0 38	5 7	5 45	5 46	6 19	11 21	11 37	5 10	5 42	2 26	3 10	10 10	10 38
S	7	9 29	9 51	1 1	1 13	10 40	11 14	9 37	10 26	12 2	mid.	6 48	7 27	1 12	1 46	6 10	6 58	6 52	7 25	—	—	0 11	6 13	3 38	4 11	11 11	11 45
M	8	10 29	10 51	2 1	2 13	11 40	12 14	10 37	11 26	1 1	1 13	8 28	9 7	2 13	2 47	7 27	8 15	8 57	9 27	—	—	1 11	7 13	4 28	5 1	12 1	12 15
M	9	11 29	11 51	3 1	3 13	12 40	1 14	11 37	12 26	2 1	2 13	9 28	10 7	3 13	3 47	8 27	9 15	9 57	10 27	—	—	2 11	8 13	5 28	6 1	1 16	1 16
W	10	12 29	12 51	4 1	4 13	1 40	2 14	12 34	1 23	3 1	3 13	10 29	11 18	4 13	4 47	9 26	10 14	10 56	11 26	—	—	3 11	9 13	6 28	7 1	2 16	2 16
W	11	1 29	1 51	5 1	5 13	2 40	3 14	1 31	2 20	4 1	4 13	11 30	12 19	5 13	5 47	10 25	11 13	11 55	12 25	—	—	4 11	10 13	7 28	8 1	3 16	3 16
F	12	2 29	2 51	6 1	6 13	3 40	4 14	2 32	3 21	5 1	5 13	12 31	1 20	6 13	6 47	11 12	12 0	12 42	1 12	—	—	5 11	11 13	8 29	9 2	4 17	4 17
F	13	3 29	3 51	7 1	7 13	4 40	5 14	3 34	4 23	6 1	6 13	1 21	2 10	7 13	7 47	12 0	12 8	12 50	1 20	—	—	6 11	12 14	9 29	10 2	5 18	5 18
S	14	4 29	4 51	8 1	8 13	5 40	6 14	4 36	5 25	7 1	7 13	2 22	3 11	8 13	8 47	1 13	1 21	1 53	2 23	—	—	7 11	1 15	10 29	11 2	6 19	6 19
S	15	5 29	5 51	9 1	9 13	6 40	7 14	5 38	6 27	8 1	8 13	3 23	4 12	9 13	9 47	2 0	2 8	2 40	3 10	—	—	8 11	2 16	11 29	12 2	7 20	7 20
M	16	6 29	6 51	10 1	10 13	7 40	8 14	6 40	7 29	9 1	9 13	4 35	5 24	10 13	10 47	3 0	3 18	3 30	4 00	—	—	9 11	3 17	12 29	1 2	8 21	8 21
M	17	7 29	7 51	11 1	11 13	8 40	9 14	7 42	8 31	10 1	10 13	5 47	6 36	11 13	11 47	4 0	4 18	4 30	5 00	—	—	10 11	4 18	1 29	2 2	9 22	9 22
W	18	8 29	8 51	12 1	12 13	9 40	10 14	8 44	9 33	11 1	11 13	6 59	7 48	12 13	12 47	5 0	5 18	5 30	6 00	—	—	11 11	5 19	2 29	3 2	10 23	10 23
W	19	9 29	9 51	1 2	1 12	10 40	11 14	9 46	10 35	12 1	12 13	8 11	9 0	1 2	1 14	6 0	6 18	6 30	7 00	—	—	12 11	6 19	3 29	4 2	11 23	11 23
F	20	10 29	10 51	2 2	2 12	11 40	12 14	10 48	11 37	1 2	1 12	9 23	10 12	2 2	2 14	7 0	7 18	7 30	8 00	—	—	1 21	7 19	4 29	5 2	12 23	12 23
F	21	11 29	11 51	3 2	3 12	12 40	1 14	11 40	12 29	2 2	2 12	10 35	11 24	3 2	3 14	8 0	8 18	8 30	9 00	—	—	2 21	8 19	5 29	6 2	1 23	1 23
S	22	12 29	12 51	4 2	4 12	1 40	2 14	12 42	1 31	3 2	3 12	11 47	12 36	4 2	4 14	9 0	9 18	9 30	10 00	—	—	3 21	9 19	6 29	7 2	2 23	2 23
S	23	1 29	1 51	5 2	5 12	2 40	3 14	1 44	2 33	4 2	4 12	12 49	1 38	5 2	5 14	10 0	10 18	10 30	11 00	—	—	4 21	10 19	7 29	8 2	3 23	3 23
M	24	2 29	2 51	6 2	6 12	3 40	4 14	2 46	3 35	5 2	5 12	1 51	2 40	6 2	6 14	11 0	11 18	11 30	12 00	—	—	5 21	11 19	8 29	9 2	4 23	4 23
M	25	3 29	3 51	7 2	7 12	4 40	5 14	3 48	4 37	6 2	6 12	3 0	3 49	7 2	7 14	12 0	12 18	12 30	1 00	—	—	6 21	12 19	9 29	10 2	5 23	5 23
W	26	4 29	4 51	8 2	8 12	5 40	6 14	4 50	5 39	7 2	7 12	4 1	4 50	8 2	8 14	1 1	1 19	1 30	2 00	—	—	7 21	1 20	10 29	11 2	6 23	6 23
W	27	5 29	5 51	9 2	9 12	6 40	7 14	5 52	6 41	8 2	8 12	5 1	5 49	9 2	9 14	2 0	2 18	2 30	3 00	—	—	8 21	2 20	11 29	12 2	7 23	7 23
F	28	6 29	6 51	10 2	10 12	7 40	8 14	6 54	7 43	9 2	9 12	6 1	6 48	10 2	10 14	3 0	3 18	3 30	4 00	—	—	9 21	3 20	12 29	1 2	8 23	8 23
F	29	7 29	7 51	11 2	11 12	8 40	9 14	7 56	8 45	10 2	10 12	7 1	7 49	11 2	11 14	4 0	4 18	4 30	5 00	—	—	10 21	4 20	1 29	2 2	9 23	9 23
S	30	8 29	8 51	12 2	12 12	9 40	10 14	8 58	9 47	11 2	11 12	8 1	8 49	12 2	12 14	5 0	5 18	5 30	6 00	—	—	11 21	5 20	2 29	3 2	10 23	10 23
S	31	9 29	9 51	1 3	1 13	10 40	11 14	9 59	10 48	12 2	12 12	9 1	9 49	1 3	1 15	6 0	6 18	6 30	7 00	—	—	12 21	6 20	3 29	4 2	11 23	11 23

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

Applying the Tidal Constant of the place, according to its sign (+ add, - subtract) to the time of high water on the given day at the port of reference, you will obtain the time of high water at the place sought.

PLACE.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
	H. M.			H. M.	
Abbeville	-1 17	Leith	Jersey (St. Helier)	+2 38	Brest
Aberdeen	-3 52	Liverpool	Kinsale	-0 18	Queencstown
Aberystwyth	+2 59	Brest	Lerwick (Shetland)	-3 47	Leith
Aden	+5 13	Dover	Limerick	+1 15	Queenstown
Agincourt	-0 42	Leith	Lisbon bar	-1 17	Brest
Alger	+0 50	Brest	Littlehampton	+0 34	Dover
Alger	-2 25	Kingstown	Llanelli bar	-0 38	Weston-s.-Mare
Alger	-0 18	Greenock	Lowestoft	-4 1	London
Alger	-1 49	Leith	Lynn & Boston Deep	-0 29	Hull
Amsterdam	-1 14	Queenstown	Margate	-2 18	London
Anglesey bridge	-0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
Antwerp	-0 2	Brest	Milford Haven entr.	-0 58	Weston-s.-Mare
Arundel and Rye bay	+0 8	Dover	Montrose	-0 52	Leith
Arundel	-0 51	Liverpool	Morlaix	+1 6	Brest
Arundel	+2 42	Londonderry	Needles point	-1 26	Dover
Arundel	-1 5	N. Shields	Newcastle	-0 23	N. Shields
Arundel	-0 8	N. Shields	Newhaven	+0 39	Dover
Arundel	+3 8	Brest	Newport	+0 16	Weston-s.-Mare
Arundel	+0 13	Dover	Nieuport	+1 6	Dover
Arundel	+0 22	Devonport	Nore	-1 28	London
Arundel	+0 19	Weston-s.-Mare	Orfordness	-2 43	London
Arundel	-2 2	Brest	Oporto	-1 17	Brest
Arundel	-1 56	Liverpool	Ostende	+1 13	Dover
Arundel	+0 37	Dover	Padstow	-1 41	Weston-s.-Mare
Arundel	-0 23	Greenock	Peel, Isle of Man	-0 15	Liverpool
Arundel	+0 2	Weston-s.-Mare	Pembroke Dock	-0 42	Weston-s.-Mare
Arundel	+4 22	Liverpool	Penzance	-1 13	Devonport
Arundel	-0 10	Kingstown	Peterhead	-1 43	Leith
Arundel	-0 47	London	Piel harbour, Barrow	-0 18	Liverpool
Arundel	+4 2	Brest	Plymouth breakwater	-0 6	Devonport
Arundel	-1 37	Londonderry	Poole	-3 2	Dover
Arundel	-0 23	N. Shields	Port Carlisle	+0 47	Liverpool
Arundel	-0 10	Brest	Portland breakwater	+1 18	Devonport
Arundel	-0 27	Dover	Port Patrick	-0 58	Greenock
Arundel	+4 41	Greenock	Portsmouth	+0 29	Dover
Arundel	-2 21	Leith	Ramsgate	-2 19	London
Arundel	+0 33	Devonport	Rotterdam	+4 33	Dover
Arundel	+0 8	Dover	Santander	-0 17	Brest
Arundel	+7 19	Brest	Scarborough	+0 48	N. Shields
Arundel	+0 3	Kingstown	Selsea bill	+0 33	Dover
Arundel	+0 17	Queenstown	Sheerness	-1 21	London
Arundel	-0 11	Liverpool	Shoreham	+0 22	Dover
Arundel	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
Arundel	-0 16	Kingstown	Southampton	-0 42	Dover
Arundel	-0 27	Dover	Spurn point	-1 3	Hull
Arundel	+0 56	Dover	St. Ives	-2 10	Weston-s.-Mare
Arundel	+0 38	Devonport	St. Malo	+2 18	Brest
Arundel	-0 46	Devonport	St. Mary (Scilly)	-1 16	Devonport
Arundel	+6 57	Brest	St. Nazaire	-0 7	Brest
Arundel	-0 47	Brest	Stornoway	+6 38	Greenock
Arundel	-1 59	Hull	Stromness (Orkneys)	-5 17	Leith
Arundel	-0 12	Liverpool	Sunderland	-0 1	N. Shields
Arundel	-0 5	Dover	Swansea bay	-0 53	Weston-s.-Mare
Arundel	-0 29	Devonport	Tay bar	-0 11	Leith
Arundel	+1 42	Dover	Tees bar	+0 22	N. Shields
Arundel	-0 26	Queenstown	Tenby	-1 12	Weston-s.-Mare
Arundel	-1 27	Brest	Thurso	-5 49	Leith
Arundel	+0 10	Greenock	Torbay	+0 17	Devonport
Arundel	+2 51	Weston-s.-Mare	Tralee bay	-0 58	Queenstown
Arundel	+2 26	Brest	Ushant (Ouessant)	-0 15	Brest
Arundel	-0 48	London	Valentia harbour	-1 19	Queenstown
Arundel	-0 53	Hull	Waterford	+0 19	Queenstown
Arundel	+2 50	Brest	Westport	-0 4	Queenstown
Arundel	+0 5	N. Shields	Wexford	+2 20	Queenstown
Arundel	-1 52	London	Whitby	+0 22	N. Shields
Arundel	+6 4	Brest	Whitehaven	-0 9	Liverpool
Arundel	+0 21	Dover	Wick	-2 55	Leith
Arundel	-1 12	Liverpool	Wicklow	-0 41	Kingstown
Arundel	-0 53	N. Shields	Workington	-0 19	Liverpool
Arundel	+5 42	Brest	Yarmouth road	-4 43	London
Arundel	-1 59	Leith	Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. W. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C.; 6, Lord Street, Liverpool; and 10, Berridge Street, Leicester.

ENGLISH (APPLICATIONS).

1285. Peter Jordan, Paterson, Passaic, New Jersey, U.S.A. "Improvement in governors for marine steam-engines." (A communication.)

1297. William Welch, Portsmouth, Southampton, Hants. "Improvements in coating or covering the surfaces of iron or steel ships and other metallic surfaces to protect and prevent condensation upon them, and in coating iron or steel decks of ships or vessels."

1317. William Rudd Oswald, Gracechurch Street, London. "Improvements in bearings or means for supporting screw-propeller shafts in the stern tubes, pipes, or boxes of screw-steamers."

1364. Baron Constantin Adrien Herman Chrétien de Winter, Paris, France. "Improvements in the construction of ships or vessels, and in the apparatus employed therein, parts of which improvements are also applicable to other structures." (A communication.)

1375. Frederick William Eames, Watertown, New York, U.S.A., and John McIntosh, Liverpool, England. "Improved apparatus for regulating the supply of steam to marine engines."

1463. Ralph Hodgson, Grant Road, Clapham Junction, London. "A new or improved apparatus for raising sunken vessels."

1472. George Washington Robertson, Glasgow, Lanark. "Improvements in steam steering-gear, parts of which improvements are otherwise applicable where motive power is required."

1496. Thomas Mudd, Hartlepool, Durham. "Improvements in and relating to apparatus for preventing 'racing' in marine engines."

1513. James Taylor, Gracechurch Street, London. "Improve-

ments in vessels designed to carry grain in bulk with or without other cargo."

1514. Francis William Willcox, Sunderland, Durham. "Improvements in apparatus for steering ships or vessels."

1551. William Strondley, Brighton, Sussex. "Improvements in speed indicators for locomotive, marine, and other engines and rotating machines."

1552. John Westberg, of Brahestad, Finland, Russia, at present residing at Rood Lane, London. "Improvements in apparatus for scraping ships' bottoms."

1569. Mark Dring and John Pattison, both of West Hartlepool. "Improvements in fitting shifting-boards in ships or vessels for carrying grain cargoes in bulk."

1649. Alfred Julius Boulton, of the firm of Wm. P. Thompson and Co., 323, High Holborn, Middlesex. "Improvements in or relating to signals chiefly for use at sea, and in apparatus therefor." (A communication.)

1652. Joseph Edouard Jacobé d'Arembécourt, Paris, France. "Improvements in propelling ships or vessels, and in the apparatus employed therein." (A communication.)

1659. Edmund Ernest Bentall, Maldon, and Frederick Arthur Bentall, of the same place. "Improvements in mast winches and capstans."

AMERICAN.

238508. John Lewis and Frederick A. Brown, Boston, and Edward Cunningham, Milton, Mass. "A card and magnetic needle for mariners' compasses."

238701. Andrew McFarren, Jun., and Charles Field, Toronto, Ontario, Canada. "A sliding seat for row-boats."

238947. John McLennan, Finsbury Park Road, and Richard Owen, England Lane, Haverstock Hill, Middlesex, England. "A paddle-wheel."

BELGIAN.

53874. D. M. J. Reid, Calcutta. "Improvements in fire boxes for locomotive, marine, or stationary engines."

53912. E. Goëhrung, Stuttgart. "Air and sea navigation."

53970. W. Wurdemann, Paris. "A steam stop for marine engines."

54019. E. A. Bishop, Paris. "Discharging dredging boats."

GERMAN.

12625. J. P. S. Johansen, Copenhagen. "A life apparatus for ships' crews and passengers."

12634. F. Kleemann, Wandersleben, near Dietendorf. "A universal motion and steering apparatus for vessels."

12652. G. Wilson, London. "Machinery for propelling vessels."

FRENCH.

138783. Massart and Bouron, Paris. "An insubmersive vessel with a double coat, protecting the cargo and engines from damage, and with a contrivance for increasing or lessening the water-line on the voyage at the pleasure of the captain."

SHIPMASTERS' SOCIETY.—In consequence of the premises in Jeffrey's Square, St. Mary Axe, being inconveniently situated for many of the members of this Society, arrangements have been made to remove to, and the Society is now lodged at, a more central position, 60, Fenchurch Street (the corner of London Street).

UNITED STATES.—TIME ALLOWED TO DISCHARGE VESSELS.—The attention of shipmasters and consignees is called to the following schedule of time allowed to discharge vessels, according to the United States customs law (day of entry, holidays and stormy weather not included). By the Act, approved March 2, 1861, the time allowed to discharge vessels is as follows :—Less than three hundred tons, eight working days ; three hundred and less than eight hundred, twelve working days ; eight hundred tons and upwards, fifteen working days. At the expiration of the time a notice will be sent to collector, surveyor and consignees and a special general order will be issued for all goods remaining on board. For each additional day the vessel is subject to a charge of 4 dollars per day for services rendered by the discharging officer.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

PLACE.	SUBJECT.
ENGLAND—East Coast—Outer Gabbard Buoy	New Automatic signal-buoy.
" West Coast—St. Ives	Outer pier light altered in position.
IRISH SEA—Ile of Man—Langness Point	New siren fog-signal.
IRELAND—East Coast—Dublin Bay—Muglin Rocks	New beacon.
" South Coast—Waterford Harbour—Cove	New light.
NORTH SEA—Coast of Jutland, &c.	Current.
" Weser River—Fort Lang-lütjen	Light discontinued.
NORWAY—West Coast—Rosholm	New flashing light.
" " Lepsö Island—Ellevik	New flashing light.
BALTIC ENTRANCE—Kattegat—Sweden—Winga Island	New lights for boat harbour.
BALTIC—Sweden—South Coast—Carls-hamn	New leading light.
BALEARIC—West Coast—Vigo Bay	Telegraph cable and new buoys.
MEDITERRANEAN—Italy—West Coast—Gulf of Spezia	Alteration of lights at breakwater.
BLACK SEA and Azov Gulf	Particulars of lights.
SOUTH ATLANTIC—Rocas Reef	Intended light.
BAY OF BENGAL—Ceylon—West Coast—Colombo	Alteration of light on breakwater.
INDIA—West Coast—Ratnagiri	Proposed alteration in colour of light.
" Coromandel Coast—Arneghon and Pulicat	Alteration in lights.
" British Burma—Akyab—Borongo Island	New beacon on table land.
EASTERN ARCHIPELAGO—Sunda Strait—Java—First Point	Particulars of light.
CHINA SEA—Min River—Hebe Rock	Position determined.
AUSTRALIA—East Coast—Moreton Bay—Brisbane River—Francis Channel	Additional lights.
NEW ZEALAND—Middle Island—East Coast—Timaru	Lights on breakwater.
SOUTH PACIFIC—Fiji Islands—Viti Levu—Suva Harbour	New leading lights.
" " " Na Mbukalou	New light.
" " " Kandavu Island—N'galoa Har-bour	Lights discontinued.
SOUTH AMERICA—East Coast—Uruguay Cape Polonio (Castillos)	New light.
" " Brazil—Sapetiba Bay	Cluster of rocks.
UNITED STATES—Florida—Cumberland Sound, Amelia Island	Temporary alteration of main light.
" " Virginia—Winter Quarter Shoal	Change of colour of light.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

132.—ENGLAND.—*East Coast.*—*Alteration in Character of the Outer Gabbard Buoy.*—With reference to previous notice, one of *Courtenay's Automatic Buoys* has been placed in the position heretofore occupied by the Outer Gabbard buoy.

133.—ENGLAND.—*West Coast.*—*St. Ives Outer Pier Light.*—*Alteration in Position.*—In consequence of damage to the outer pier at that place, during the gale of 19th January, 1881, the light previously shown from the extreme end of the structure, is now exhibited about 140 feet within the extremity; which is as far out as is consistent with safety, in the present damaged condition of the work. The light consists of a red globe lantern with refracting prisms.

134.—IRISH SEA.—*Isle of Man.*—*South Coast.*—*Fog-Signal on Langness Point.*—A siren fog-signal has been established at Langness lighthouse, Langness point, at an elevation of about 30 feet above the level of the sea; on and after the 16th day of May, 1881, it will be sounded night and day during foggy or thick weather, beginning as soon as possible after the commencement of the fog. The signal will be sounded at regular intervals, the periods of sound being of five seconds duration, and the periods of silence of forty seconds duration.

135.—IRELAND.—*East Coast.*—*Dublin Bay.*—*Beacon on Muglin Rocks.*—Erected on the highest part of Muglin rocks, south side of the entrance to Dublin bay; it is 29 feet high, constructed of stone, conical in shape, and coloured white.

136.—IRELAND.—*South Coast.*—*Waterford Harbour.*—*Light at Cove.*—Exhibited from a lighthouse recently erected at Cove, on the south bank of Suir river, about $1\frac{1}{2}$ mile below Waterford bridge. The light, elevated about 25 feet above high water, shows red towards Waterford, but is cut to show white south-westward of a line drawn to the New Boat club-house (on the south bank of the river, 800 yards above the light). It shows green down the

river, but is cut to show *white* south-eastward of a line drawn to Giles' quay (on the north bank of the river, fronting Snowhaven house). On entering, the light changes from green to red when abreast of it. The lighthouse, constructed of concrete, is erected on a rocky foundation at the edge of the river bank.

137.—NORTH SEA.—*Current off the Coast of Jutland, and between Horn Reefs and the Texel.*—The Committee of Lloyd's has drawn attention to the belief entertained by seamen of an easterly current during westerly gales, between Horn reefs and the Texel; and to the fact that British steam-vessels bound from Dover to the Baltic are frequently picked up by these reefs. The effects of south-west and westerly winds in causing a current (or drift of the surface water) in the North sea, independent of tidal influences, have long been recognised, as will be seen in the North Sea Pilot, part IV., 1878, page 38, published by the Admiralty:—"The current in the North sea in general is sensibly affected by the winds, a circumstance particularly necessary to be attended to by vessels bound from the British shores to the opposite coast. With the winds from the south-west quarter the current sets to the east and north-eastward, generally across the Jutland bank, and the south side of the Skaggerak towards the Skaw. * * * It is therefore, necessary to be cautious that a vessel is not set a-head of her reckoning, and every attention should be paid to the lead." That prevailing westerly winds have the effect of producing a surface or drift current (apart from tidal phenomena) has also been observed on the line of coast between Horn reefs and the Texel; and it seems to be further considered that this drift current flows out again to the northward, along the coast of Schleswig-Holstein, but that it is not of a permanent character. Mariners are informed accordingly.

138.—NORTH SEA.—*Weser River.*—*Fort Langlütjen Light.*—The light on the landing pier of fort Langlütjen, east side of Langlütjen sand is discontinued.

139.—NORWAY.—*West Coast.*—*Fishing Light on Rosholm.*—A fishing light will be exhibited yearly from 25th January to 8th April, on Rosholm (Rosholmene); it is a *fixed white* light, visible between the bearings of N.N.E. $\frac{1}{2}$ E. (through south) and N.W.

by W. $\frac{1}{2}$ W. Position, lat. $62^{\circ} 36' 0''$ N., long. $6^{\circ} 3' 35''$ E. Variation, $16\frac{1}{2}^{\circ}$ W.

140.—NORWAY.—*West Coast.*—*Lepsö Island.*—*Fishing Light at Ellevik.*—A fishing light will be exhibited yearly from 2nd February to 25th March, near Ellevik (Hellevik), north coast of Lepsö island. Position approximate, lat. $62^{\circ} 38' 10''$ N., long. $6^{\circ} 10' 0''$ E.

141.—BALTIC ENTRANCE.—*Kattegat.*—*Sweden.*—*Winga Island.*—*Boat Harbour Lights.*—Two fixed white lantern lights are now exhibited, for the western entrance to the boat harbour, Winga island; the outer light, elevated 10 feet above the sea, is shown from the south side of Winga island. Position approximate, lat. $57^{\circ} 37' 55''$ N., long. $11^{\circ} 36' 40''$ E. The inner light, elevated 19 feet above the sea, is shown from a post on the pontoon bridge, and bears E. $\frac{1}{4}$ N. from the outer light, distant 136 yards.

Note.—Entering Winga boat harbour from the westward, bring these lights in line when distant about three-quarters of a mile, and then steer for them. Variation, $12\frac{1}{4}^{\circ}$ W.

142.—BALTIC. — *Sweden.* — *South Coast.*—*Leading Light at Carlshamn.*—It is a fixed red light, elevated 17 feet above the sea, and visible from the approach to the harbour between the bearings of N. 6° E. and N. 20° W., from a distance of 5 to 6 miles. It bears S. 13° W. from Carlshamn white light, distant 228 yards. This light will be shown (like the white light) as long as the harbour is not closed by ice. Variation, $9\frac{3}{4}^{\circ}$ W.

143.—SPAIN.—*West Coast.*—*Additional Telegraph Cable in Vigo Bay.*—A third telegraph cable is laid between Vigo and Caminha (Camina). At Vigo, the terminus of this cable is the same as that of the other cables, at point de la Lage; thence it is laid at about the distance of from 2 to 4 cables south-eastward of those cables, as far as the South channel entrance; from this position, it takes a S.S.W. direction and passes cape Silleiro at the distance of about one mile. Mariners are cautioned not to anchor in the vicinity. Also, two buoys, between which the telegraph cables are laid, have been placed off the town of Vigo. The outer buoy (red with staff and ball) is moored in 11 fathoms water, with point del Castro bearing S.E. by E. $\frac{1}{2}$ E., distant

4 cables. The inner buoy (red with staff and ball) is moored in 10 fathoms water, with point de la Lage (Vigo point) bearing south, distant 2 cables. Variation, 20° W.

144.—MEDITERRANEAN.—*Italy—West Coast.—Gulf of Spezia.*—*Alterations in Santa Teresa and Santa Maria Lights.*—On account of the works in progress, it has become necessary to make the following alterations in the positions of the lights exhibited at Santa Teresa, and at Santa Maria points, gulf of Spezia. The new light of Santa Teresa, will be erected on the outer extremity of the small breakwater below the fort. The new light of Santa Maria will be placed on one of the new walls surrounding the fort, in such a position as to be visible from the gulf, and also from within the breakwater as far as the entrance of the dock; elevated 49 feet above the sea; it will be a *flashing* light; but, pending the alteration, two *white* lights, placed vertically, will be exhibited. Further particulars will be given.

145.—BLACK SEA.—Particulars concerning certain lights, derived from the Russian Admiralty Light List, 1880:—

(1.) KERTCH STRAIT.—*Tustinski Light-Vessel.*—This light-vessel, moored in 19 feet water, near the south-west extreme of Tuzla bank, is painted black, and carries a black frame ball at the main-mast head. During the day, when at her station, a yellow flag with blue cross is hoisted at the mizen-mast. The light (fixed white) is visible from a distance of 6 miles. During thick or foggy weather, a bell is sounded *once every minute*. The light-vessel is withdrawn on the close of navigation, when the position is indicated by a perch and flag.

(2.) GULF OF AZOV.—*Bielosarai Light.*—Referring to notice in 1879, on the exhibition of two fixed white lights on Bielosarai spit, northern entrance point to the gulf of Azov. One light (fixed white) is now exhibited from an octagonal-shaped light-house, situated about 2,360 yards within the extremity of the spit, visible between the bearings of S.E. $\frac{1}{2}$ E., through north, and S.W. $\frac{1}{2}$ W.

(3.) GULF OF AZOV.—*Petchany Light-Vessel.*—This light-vessel, moored near the extremity of Szalnitz bank, gulf of Azov, carries a black frame ball at the main-mast head. Position approximate,

lat. $47^{\circ} 0' 30''$ N., long. $38^{\circ} 15' 30''$ E. During thick or foggy weather, a bell is sounded for the space of *ten minutes*, at intervals of *five minutes*.

(4.) GULF OF AZOV.—*Beglitzkaia Light-Vessel*.—From Beglitzkaia (Golden bank) light-vessel, moored south-eastward of Beglitzkaia spit, one light (fixed red) is now exhibited. A red frame ball is carried at the main-mast head. During thick or foggy weather, a bell is sounded *once every three seconds* for the space of *ten minutes*, at intervals of *five minutes*.

146.—SOUTH ATLANTIC.—*Intended Light on Rocas Reef*.—The Brazilian Government propose to erect an iron lighthouse on Rocas reef, situated 130 miles to the N.E. of cape St. Roque, east coast of Brazil. A merchant transport accompanied by a Government steam-vessel will shortly convey the materials, mechanics and their provisions, to Rocas reef from Pernambuco. Position approximate, lat. $3^{\circ} 51' 30''$ S., long. $33^{\circ} 49' 0''$ W.

147.—BAY OF BENGAL.—*Ceylon*.—*West Coast*.—*Colombo*.—*Light on Breakwater*.—At the close of the present north-east monsoon, the Titan Crane will be moved in from the end of the breakwater. The red light now shown from the Titan will then be exhibited from the mast of a boat, at an elevation of 30 feet. The boat will be moored as close as possible to the end of the breakwater, and will remain there throughout the south-west monsoon, or when the Titan is not in position.

148.—INDIA.—*West Coast*.—*Ratnagiri*.—*Proposed Alteration in Colour of Light*.—On the 1st June, 1881, the red *fixed* light, at present exhibited from the south bastion of Ratnagiri fort will be changed to a *white fixed* light.

Note.—This light cannot be mistaken for the light on Dabhol high land—about 35 miles to the northward—as the latter light is extinguished during the south-west monsoon, *i.e.*, from 1st June to 1st October.

149.—INDIA.—*Coromandel Coast*.—*Armeghon (Armogham)*.—*Intended Temporary Discontinuance of Light*.—It is intended to exhibit a *white revolving* light at Armeghon; and in order to effect this change, the *white fixed* light, now shown, will be discontinued on and after the 17th April, 1881.

(2.) *Pulicat*.—*Intended Change of Colour of Light*.—It is also intended to change the Pulicat red fixed light to a *white fixed* light. Due notice will be given of the dates of exhibition of the new lights.

150.—INDIA.—*British Burma*.—*Akyab*.—*Beacon on Table land of Borongo Island*.—As a guide to vessels approaching the port of Akyab, and in order to distinguish Table land from the other hills on western Borongo, a basket beacon has been erected on the top of the old light-tower. The tower is painted white, and, in the afternoon, shows up well against the trees in the background. The beacon is 8 ft. in diameter, painted black and yellow in perpendicular stripes, and, in clear weather, can be seen above the trees from a distance of nearly 10 miles.

151.—EASTERN ARCHIPELAGO.—*Approach to Sunda Strait*.—*Java*.—*Particulars of First Point Light*.—With reference to Notice, p. 328, on the re-exhibition of the permanent light on First point (Tanjong Koelong) the light (revolving white) shows, as formerly, *every half-minute*, a flash of *six seconds* duration, followed by an interval of darkness lasting *twenty-four seconds*; visible between the bearings of N. 17° W. (through east) and N. 84° W., except where obscured by Princes (Prinsen) island; elevated 260 feet above high water, and seen from a distance of 23 miles. The lighthouse (lower than formerly) is now 131 feet high, constructed of stone and painted white, as is also the keeper's dwelling. The provisional light has been discontinued.

152.—CHINA SEA.—*Approach to Min River*.—*Position of Hebe Rock*.—With reference to Notice, p. 167, on the reported position and description of Hebe rock or reef, Captain Napier, H.M. Surveying vessel *Maggie*, gives the result of an examination recently made by the boats of that vessel in search of the danger. Hebe rock is a pinnacle, about 50 feet in extent, and steep-to, with 11 feet over it at low water spring tides, and 13 to 14 fathoms, mud to the north-west and southward. From it the following marks and bearings were observed:—Reef island summit seen in the gap between Changchi island peak and Nob peak (Changchi island), but nearer Nob peak. The Northern breakwater rock (Tong-sha island) in line with Hai-tan island summit. Sea Cat

islet, N. $24\frac{1}{4}^{\circ}$ E.; Sea Dog islet, N. $32\frac{1}{4}^{\circ}$ E., distant $1\frac{1}{4}$ mile; Tong-sha island summit, S. $8\frac{3}{4}^{\circ}$ W.; Matsou island, N. $14\frac{1}{2}^{\circ}$ W.

Note.—Eastward of Hebe rock, at the distance of one cable, a shoal spot was found, with $4\frac{1}{2}$ fathoms over it. *Variation*, 1° W.

153.—AUSTRALIA.—*East Coast.*—Moreton Bay.—Brisbane River Entrance.—*Additional Lights in Francis Channel.*—Three white lights are now exhibited in Francis or West channel, from the following positions, viz.:—1. From the corner beacon at the south-east end of the outer cutting. 2. From the double beacon in the bend. 3. From the corner beacon seaward of the light-vessel.

154.—NEW ZEALAND.—*Middle Island.*—*East Coast.*—Timaru.—*Lights on Breakwater.*—Exhibited from the extremity of the breakwater; they are red lights, placed 10 feet apart, elevated 18 feet above high water, and visible seaward from a distance of about 4 miles.

155.—SOUTH PACIFIC.—*Fiji Islands.*—*Viti Levu.*—*Leading Lights at Suva Harbour.*—Two leading lights are now exhibited on the northern shore of Suva (Tomba-ko-suva) harbour, south-east coast of Viti Levu. The low light is *fixed red*, visible from a distance of 5 miles; situated on the beach about $2\frac{1}{2}$ cables eastward of the east end of Nukumaroreko islet; elevated 80 feet above high water. Position, lat. $18^{\circ} 6' 50''$ S., long. $178^{\circ} 24' 40''$ E. The high light is *fixed white*, elevated 320 feet above the sea, and visible from a distance of from 8 to 12 miles; it bears from the low light north, distant 1,900 yards; not visible eastward of the bearing N.W. These lights in line bearing north lead through the channel into Suva harbour. The lighthouses, square, and of wood, are white, serving as day marks. *Variation*, $9\frac{1}{4}^{\circ}$ E.

156.—SOUTH PACIFIC.—*Fiji Islands.*—*Light at Na Mbukalou.*—Exhibited at Na Mbukalou, east side of Suva harbour, to lead clear of the northern extreme of the eastern entrance reef. It is a *fixed green* light; not visible southward of the bearing E. $\frac{1}{4}$ S. Entering the harbour, the light should be steered for immediately it is seen. Position, lat. $18^{\circ} 8' 10''$ S., long. $178^{\circ} 26' 10''$ E. *Variation*, $9\frac{1}{4}^{\circ}$ E.

157.—SOUTH PACIFIC.—*Fiji Islands*.—*Kandavu Island*.—*N'galoa Harbour*.—*Lights Discontinued*.—The leading lights for the Main channel into N'galoa harbour have been discontinued; and the beacons from which they were shown have been removed.

158.—SOUTH AMERICA.—*East Coast*.—*Uruguay*.—*Light on Cape Polonio (Castillos Point)*.—From 1st March, 1881, a light has been exhibited from a lighthouse recently erected on cape Polonio (Castillos point); it is a *fixed white* light, elevated 137 feet above the sea, and visible from a distance of from 20 to 22 miles. The lighthouse, constructed of gray masonry, with three broad white horizontal bands equidistant, and built on a circular platform, is situated near the beach. Position approximate, on Admiralty chart, lat. $34^{\circ} 25' 0''$ S., long. $53^{\circ} 47' 0''$ W.

159.—SOUTH AMERICA.—*Brazil*.—*Rocks Reported Westward of Marambaya Rock*.—The existence of a cluster of rocks, lying one mile westward of Marambaya rock, approach to Sapetiba bay is reported by the commander of the French steam vessel *Savaie*. Position as given, lat. $23^{\circ} 6' 50''$ S., long. $43^{\circ} 50' 50''$ W.

160.—UNITED STATES.—*Florida*.—*Cumberland Sound*.—*Temporary Alteration in Amelia Island Principal Light*.—While the lighthouse is being repaired, the principal light on Amelia island, entrance to Cumberland sound, will be discontinued, and a light showing *white flashes every thirty seconds*, elevated 67 feet above high water, will be exhibited from a temporary structure near the lighthouse. The structure is an open wooden pyramid surmounted by a lantern.

161.—UNITED STATES.—*Virginia*.—*Change of Colour of Light on Winter-Quarter Shoal Light-Vessel*.—On July 1, 1881, the light displayed from the light-vessel off Winter-Quarter shoal, sea-coast of Virginia, will be *fixed red*, instead of fixed white, as now shown.

OUR OFFICIAL LOG.

The following additional circular has been issued by the Board of Trade in respect to the new examinations for certificates of competency, particulars of which were published in the *Magazine*, March No., pp. 247-252.

EXAMINATIONS OF MASTERS AND MATES.

NOTICE TO EXAMINERS AND CANDIDATES.

The following Rules as to the time to be occupied by Candidates in their Examinations are to be substituted for those at present in force.

EXAMINATIONS FOR CERTIFICATES OF COMPETENCY FOR
FOREIGN-GOING STEAMSHIPS.

Candidates for Second Mates' Certificates of Competency must complete the whole of their examination in navigation in eight hours, including the time allowed for writing the definitions (Exn. 4^a), the paper on the adjustment of the sextant, and the correction of all errors and oversights; but the nautical problems on Forms "Exn. 4" and "Exn. 5" must be completed within six hours and without the candidates leaving the premises during that period.

Candidates for Only and First Mates' Certificates must complete the whole of their examination in navigation in eleven and a half hours, including the time allowed for the papers on the adjustment of the sextant, and the chart, and for the correction of all errors and oversights; but the nautical problems on Forms "Exn. 4," "Exn. 5," and "Exn. 6" must be completed within six hours, and without the candidates leaving the premises during that period.

Candidates for Masters' Certificates must complete the whole of their examination in navigation in fourteen hours, including the time allowed for the papers on the sextant, the chart, and the compass deviation, and for the correction of all errors and oversights; but the problems on Forms "Exn. 4," "Exn. 5," and "Exn. 6" must be completed within six hours, and without the candidates leaving the premises during that period.

Candidates, after finishing the problems required of the respective grades on the first day of examination, should proceed, until the end of that day, with such subjects as the definitions, sextant, chart, and Question 19 of Form "Exn. 7."

The Sumner Problem (Exn. 6a) must on no account be given out to any of the grades on the first day of the examination, but should be the commencement of the candidates' work on the second day, and on completion of this problem the candidates for masters' certificates should proceed with the problems on paper "Exn. 7."

EXAMINATIONS FOR CERTIFICATES FOR HOME TRADE
PASSENGER SHIPS.

On and after the 1st August next some alterations will be made in the examinations for Home Trade mates' and masters' certificates and the time to be allowed candidates for completing the whole of their arithmetical and chart papers must not exceed in the case of the mate five hours, and in that of the master six hours.

EXAMINATIONS FOR THE ORDINARY FOREIGN-GOING
CERTIFICATES.

On and after the 1st August next candidates for the ordinary Foreign-going certificates of competency will be allowed the same amount of time to perform their navigation, &c., as herein-before laid down for the respective grades for Foreign-going steamship certificates.

EXAMINATIONS FOR CERTIFICATES OF COMPETENCY AS
MASTERS OF PLEASURE YACHTS.

Candidates for Certificates as Masters of Pleasure Yachts will be allowed the same amount of time for completing their examinations as the ordinary masters.

Punctually at the expiration of the prescribed time all the papers should be called up, whether completed or not, and if not completed the candidate will be declared to have failed, unless the Local Marine Board or the examiners see fit to lengthen the period in any special case; if however the period is lengthened in any case

the special circumstances of that case, and the reasons for lengthening the period, together with the time allowed, must be reported to the Board of Trade by the examiners in the column for "remarks" on the Form "Exn. 14."

It is anticipated that but few of the candidates for certificates of competency for any of the foregoing grades will require the whole of the time herein allowed for completing their examination in navigation; and ample time has been prescribed, so that candidates may perform their work in a careful, clear, and legible manner, and to the entire satisfaction of the examiners.

THOMAS GRAY, *Assistant-Secretary*,
Marine Department, Board of Trade, March, 1881.

ICE AND WEATHER SIGNALS.

NOTICE TO SHIPMASTERS BOUND FOR PORTS IN GULF AND RIVER ST. LAWRENCE.

The Canadian Minister of Marine and Fisheries notifies that arrangements have been made by the Government of Canada, by which, with the co-operation of the French authorities at St. Pierre, Miquelon, signals will be shown daily during the month of April in each year, from the Semaphore established at the lighthouse station on Point Gallantry, St. Pierre, Miquelon, by which masters of vessels bound for ports in the Gulf and River St. Lawrence will be advised as to the condition of the ice in the Gulf, the winds, the temperature, and weather indications. Daily dispatches are received at St. Pierre, *via* Sydney, from the telegraph and signal stations established by the Government of Canada last season, at South-West Point, Anticosti, Cape Rosier (Gaspé), Cape Magdalen (Gaspé), and Grosse Isle and House Harbour, Magdalen Islands, and shipmasters desiring information as to the state of the ice and weather in the Gulf can obtain it by lying to off Point Gallantry, St. Pierre, and signalling for information, which will be supplied free of cost.

OFFICIAL INQUIRIES AT HOME, 1881.

941. *Cape Sable*, ship; built at Glasgow, 1874; owned by Mr. A. P. Lyle; tonnage, 1,415; Sunderland to Singapore; coals;

supposed to have foundered at sea. Inquiry held at Sunderland, March 9, 1881, before Booth and McKenzie, Judges; Visconti and Kennedy, N.A. No evidence before Court upon which to found opinion as to loss.

942. *Fairfax*, s.s.; built at Govan, 1865; owned by General Iron Screw Collier Company; tonnage, 708; Havre to the Tyne; ballast; lost near Beachy Head, February 10, 1881. Inquiry held at London, March 7, 1881, before Rothery, Wreck Commissioner; Curling and Vaux, N.A. Master in default for steering improper courses, whereby his vessel got too far to the westward, and for neglecting to use the lead. Certificate suspended for six months; recommended for one as mate during his suspension.

943. *Polly Pinkham*, schooner; built at Teignmouth, 1878; owned by Mr. W. Pinkham; tonnage, 141; Rio Grande to Liverpool; calcined bones, &c.; lost near Annewstown, County Waterford, February 13, 1881, when loss of life ensued. Inquiry held at London, March 4, 1881, before Rothery, Wreck Commissioner; Clarke and Harland, N.A. Master in default for steering improper courses, neglecting the lead, for not being on deck at a critical time, and for not keeping a proper look-out. Certificate suspended for six months; recommended for one as mate.

944. *Queen of the Sea*, brig; built at Plymouth, 1880; owned by Mr. C. Gent; tonnage, 253; New York to Plymouth; oil cake, wheat, &c.; abandoned at sea, December 31, 1880. Inquiry held at London, March 3, 1881, before Rothery, Wreck Commissioner; Forster and Castle, N.A. Casualty due to shifting of the cargo. Abandonment justifiable.

956. *John Kendall*, brig; built at Dartmouth, 1866; owned by Mr. R. T. James; tonnage, 239; Greenock to Barbadoes; coals; lost off County Down, February 27, 1881. Inquiry held at Greenock, March 17, 1881; before Neil and Ross, Judges; Picard, Murdoch, and Cowie, N.A. Master in default in making no allowance for tide or currents, or for the beam sea. Certificate suspended for three months.

957. *Caroline Goodyear*, schooner, and *Laconia*, s.s.; the former built at Boscastle, 1861; owned by Mr. J. H. Mitchell;

tonnage, 132; Teignmouth to Glasgow; pipe clay; the latter built at Glasgow, 1856; owned by Mr. B. Papayanni; tonnage, 1,295; Liverpool to Alexandria; general cargo; in collision near Bardsey Light, January 15, 1881, when loss of life ensued. Inquiry held at Liverpool, March 19, 1881, before Raffles, Stip. Mag.; Powell, Wilson, and French, N.A. Second mate of the steamer in default for not slackening speed whilst in a snow storm, in contravention of the regulations for preventing collisions at sea; certificate suspended for three months.

958. *Clytie*, s.s.; built at Low Walker, 1875; owned by Mr. W. G. Nelson; tonnage, 463; Newcastle to Tarragona; iron, coal, &c.; lost on the Long Sand, February 20, 1881. Inquiry held at London, March 18, 1881, before Rothery, Wreck Commissioner; Aplin, Hight, and Beasley, N.A. Casualty due to negligent navigation on the part of the master in making no allowance for the sweep of the tide, when laying the course from the Newarp light ship.

959. *Mary Stewart*, barque; built at Black River, New Brunswick, 1871; owned by Mr. L. Stewart; tonnage, 468; North Shields to Baltimore; soda; lost on the Shingles Sand, Princes Channel, February 2, 1881. Inquiry held at London, March 21, 1881, before Rothery, Wreck Commissioner; Parfitt and Ronaldson, N.A. Master in default for negligent navigation in laying his vessel on a westerly course, believing himself to be off Calais, whilst, as a matter of fact, he was off the mouth of the Thames; certificate suspended for six months; recommended for one as mate.

960. *Monsoon*, barque; built at Bath, Maine, U.S., 1851; owned by Mr. R. R. Douglas; tonnage, 678; Liverpool to Payta; coals; abandoned at sea, February 8, 1881. Inquiry held at Liverpool, March 23, 1881, before Raffles, Stip. Mag.; Vaux and Clarke, N.A. Abandonment justifiable.

961. *Caledonia*, s.s.; built at Port Glasgow, 1876; owned by the London and South Western Railway Company; tonnage, 355; employed carrying mails and passengers from Southampton to the Channel Islands; lost on Oyster Rock, off St. Heliers, Jersey, February 19, 1881. Inquiry held at London, March 24, 1881, before Rothery, Wreck Commissioner; Anderson and Comyn, N.A.

Master in default for allowing his vessel to get too far to the southward, and attempting to pass between the Oyster Rock and the Breakwater at full speed; certificate suspended for three months; recommended for one as mate.

962. *Royal Charter*, schooner; built at Portmadoc, 1858; owned by Mr. D. Roberts and others; tonnage, 119; Dublin to Portmadoc; ballast; lost on the Maen Mellt Rocks, March 8, 1881. Inquiry held at Liverpool, March 25, 1881, before Raffles, Stip. Mag.; Wilson and French, N.A. Loss due to careless navigation on the part of the master. Certificate suspended for three months.

964. *Gilbert Thompson*, barque; built at Birkenhead, 1862; owned by Mr. E. P. Bates; tonnage, 1,061; Calcutta to Liverpool; jute, linseed &c.; lost on the West Mouse Bank, near the Skerries, March 5, 1881. Inquiry held at Liverpool, March 28, 1881, before Raffles, Stip. Mag.; Grant, Wilson and French, N.A. Casualty caused by the vessel taking a sudden sheer to port whilst in tow of a tug, causing the towing hook to carry away. The Court acquitted all parties of default.

965. *Gardenia*, s.s.; built at Willington Quay, 1879; owned by Mr. J. Robinson; tonnage, 1275; Savannah to Bremerhaven; cotton; stranded on January 24, and also on January 26, 1881. Inquiry held at North Shields, March 19, 1881, before Jackson and Swan, Judges; Harris, White and Ward, N.A. Court had no jurisdiction to deal with master's certificate, no material damage having taken place.

968. *Linden*, s.s.; built at Sunderland, 1877; owned by Mr. R. Thorman and others; tonnage, 687; Sunderland to London; coals; stranded on the Rosse Spit Sand, March 5, 1881. Inquiry held at Sunderland, March 31, 1881, before Wilson and Scott, Judges; Cowie and Ward, N.A. Stranding due to the extreme severity of the weather. Master free from blame.

972. *Llama*, s.s.; built at Greenock, 1865; owned by Mr. J. Burns; tonnage, 391; Belfast to Glasgow; general cargo; stranded on the coast of Wigtonshire, March 8, 1881. Inquiry held at Glasgow, April 6, 1881, before Graham and Collins, Judges; Harris and Hight, N.A. Accident due to stress of weather. Master free from blame.

973. *The Craigs*; built at Kenny Bank, U.S.A., 1861; owned by Messrs. R. and H. Cuthbert; tonnage, 1,147; Pensacola to Greenock; timber; stranded in the Mull of Cantyre, March 13, 1881. Inquiry held at Greenock, April 5, 1881, before Scott and Ross, Judges; Ward and Cowie, N.A. Master not in default.

OFFICIAL INQUIRIES ABROAD, 1880-1.

945. *Lucy and Adelaide*, schooner; lost in Havannah Harbour. Inquiry held at Brisbane, June 1, 1880. No blame attached to master.

946. *Arakoon*, s.s.; accident to boiler, December 8, 1880. Inquiry held at Brisbane, December 15, 1880. Engineer to blame. Certificate cancelled.

947. *Norseman*, s.s.; stranded on Baffle Creek. Inquiry held at Brisbane, December 15, 1880. Master free from blame.

948. *Alexandra*, s.s., and *Louisa*, steam-lighter; in collision in Brisbane River, October 30, 1880. Inquiry held at Brisbane, November 16, 1880. Accident due to an error of judgment on the part of the master of the lighter *Louisa*.

949. *Asia*, s.s., and *Scindiah*, s.s.; in collision in Madras roadstead, November 18, 1880. Inquiry held at Madras, November 20, 1880. Accident due to an error of judgment on the part of the master of the *Scindiah*.

950. *Africa*, s.s., and *Yeshwanti*, pattimar; in collision off Calicut, November 30th, 1880. Inquiry held at Madras, December 11, 1880. No blame attached to master or officers of steamer. Accident probably due to the crew of the pattimar being asleep.

951. *Roraima*, s.s.; stranded on coast of New Jersey, February 1, 1881. Naval Court held at New York, February 25, 1881. Master acted imprudently. Censured.

952. *Lady Pryse*, schooner; lost in Mossel Bay, November 5, 1880. Inquiry held at Mossel Bay, November 11, 1881. Loss due to stress of weather.

953. *Bombay*, s.s.; destroyed by fire at Woosung, December 23, 1880. Inquiry held at Shanghai, January 5, 1881. Master to some extent blameworthy. Censured.

954. *A. E. Botsford*, barquentine; lost on Captain Brittan's reef, February 10, 1881. Inquiry held at St. John, Antigua, February 22, 1881. Master free from blame.

955. *Leading Star*, brig; lost near Umzim Kulu River. Inquiry held at Durban. No blame due to master.

963. *Ann*; stranded at Cape Hawke River. Inquiry held at Sydney, January 19, 1881. No charge made against master.

966. *Sorata*, s.s.; stranded near Cape Jervis Lighthouse, September 3, 1880. Inquiry held at Port Adelaide, January 17, 1881. Charge of incompetency brought against master, but Court decided they had no jurisdiction to try the matter.

967. *Craiglands*, s.s., and *Chinaman*, barque; in collision at mouth of Yangtze Kiang, January 21, 1881. Inquiry held at Shanghai, February 2, 1881. Master of *Craiglands* in default. Certificate suspended for nine months.

969. *Bannockburn*; destroyed by fire in Chittagong River, January 14, 1881. Inquiry held at Chittagong, February 3, 1881. Fire accidental, probably originated from a spark going down ventilator.

970. *Flying Spur*, barque; lost near Cape Town. Inquiry held at Cape Town, March 2, 1881. Accident due to an error of judgment on part of master. Censured.

971. *Drumduff*, s.s.; abandoned at sea, March 3, 1881. Naval Court held at New York, March 15, 1881. Abandonment due to vessel having been overladen.

GENERAL.

MERCHANT SHIPPING BILL (INDIA).—The new Merchant Shipping Bill recently introduced into the Supreme Legislative Council, and referred to a Select Committee, has been published in the *Gazette of India*. The Bill provides for the appointment of an officer called a "port inspector," who, in addition to performing the duties at present performed by the health officer, will be entrusted with the duty of inquiring into any complaints which may be made on the arrival of a ship in port by any of the crew against the

master or any other of the crew. This latter provision has been inserted in compliance with the desire of the Secretary of State for the protection of lascars or other Oriental seamen when serving on board a European ship. The Bill also extends the provisions of the Indian Merchant Shipping Act, 1875, so as to give power to hold marine Courts of Inquiry in certain cases which are at present unprovided for. This change has been introduced at the request of the local marine authorities, and is in accordance with the provisions of the English law as amended last year. Another amendment gives the local Government power to fix a scale of provisions, for less than which it will be penal for a master to contract with any lascar or native seaman, and the opportunity has been taken to amend section 26 of Act IV. of 1875, so as to provide that, when the service of any lascar is to end at any port not in British India the agreement between him and the master shall invariably stipulate for his return to British India, and not merely for his employment on board some vessel bound to such other port as may be agreed on, possibly not in British India. It is clear, says the mover of the Bill, Mr. Whitley-Stokes, that, with the extended employment of native seamen in the Eastern trade, and the increasing number of Asiatic sailors found in a destitute condition at European ports, Government should, on economical grounds, if for no other reason, devise steps to secure the return of Indian seamen to the country at the expense of the persons who take them away.

PORT OF CARTHAGENA.—It is claimed for this port that it is an advantageous coaling station; that there are no port or other Government charges whatever upon steamers calling for coals; that for pilotage, 15 shillings is charged when employed; that steamers can enter or leave the harbour at all times, pilots being in attendance at the outer pier end by day; that steamers arriving unless for loading or discharging, will at once receive free pratique by producing bill of health from port of departure, having besides 24 hours after arrival to make out their cargo and ship's manifests without the necessity of Consular signature; that vessels with any class of cargo, except tobacco, are allowed to enter this port wind-bound or for coal free.

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JUNE, 1881.

THE PRESENT ASPECT OF OUR COMMERCIAL
RELATIONS WITH FRANCE.

HE promulgation of the new Customs Tariff which has been adopted by the French Government has helped to increase rather than allay the feeling of apprehension that has existed for some time past in this country with regard to the question of arranging a new Treaty of Commerce between England and France. Although the Treaty now in force will expire on the 8th November next, no definite progress seems as yet to have been made towards the negotiation of its renewal; and the rate of the duties to be levied on imported manufactures under the new Tariff is calculated to give rise to some doubt as to whether its renewal will even be possible.

In the course of the preliminary negotiations that have been taking place between the two Governments, no less than in the new Customs Tariff which has just been published, it has been made only too clear that the French Republic has embarked on a decidedly reactionary course, so far as the principles of free trade are concerned. The French Government maintain that they have no intention of imposing duties for the purpose of encouraging native industry; indeed they assert that they do not propose to raise the duties at all. On the 11th May, M. Challemeil-Lacour assured Earl Granville that, although it is the

intention of his Government to abolish *ad valorem* duties, they desire simply to replace them by their equivalents in specific rates of duty. He further remarked that he thought unnecessary excitement had been caused in this country by the changes made in the General Tariff. To this Earl Granville replied that much satisfaction will be caused in England when it comes to be understood that "the French Government do not in effect contemplate a departure from the *status quo*."

Of course all due weight must be attached to the reassuring statements of M. Challeml-Lacour, but at the same time we must confess there are grave reasons for suspecting that they are more or less coloured by what may be termed diplomatic romance. A very general impression exists in commercial circles in this country to the effect that the French Government proposes to base the negotiation of the new Treaty upon a reduction of twenty-four per cent. upon the General Tariff; and if this surmise proves to be correct it is quite certain that the French Ambassador's assurances, however honestly they may be intended, can possess but slight practical meaning. If the French Government assume that the new Tariff has merely exchanged *ad valorem* for equivalent specific duties, it is clear that their judgment differs widely from that of experts in this country.

The following Table is extracted from a comparative statement of the duties levied on English goods under the present Treaty, and of the new duties under the General Tariff, as given by *The Times* :—

Articles.	Present Duties under Conventional Tariff.	New Duties under General Tariff.	Per Cent. Increase (+)
Linen Yarn, single, unbleached, measuring to the kilog.—	Fr. c.	Fr. c.	
2,000 metres or less ...	15 0	16 0	+7
2,000 to 5,000 metres or less...	15 0	18 0	+20
5,000 to 10,000 metres or less...	15 & 20	23 0	+15 to +53
Intermediate numbers chiefly raised 10 per cent. to 50 per cent., but one or two small decreases.			
80,000 to 100,000 metres or less	100 0	149 0	+49
Over 100,000 metres ...	100 0	200 0	+100

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Articles.	Present Duties under Con- ventional Tariff. Fr. c.	New Duties under General Tariff. Fr. c.	Per Cent. Increase (+)
Jute Yarns		Increased 25 per cent.	
Cotton Yarns		Increased 24 per cent.	
Woollen Yarns, single, bleached or not—			
Combed—Measuring to the kilog.			
30,000 metres or less... ..	10 to 25 ...	31 0 ...	+ 24 to + 210
Higher numbers		Increased 24 per cent.	
Carded—Up to 30,500 metres ...		Increased 85 per cent.	
Over 30,500 metres		Increased 60 per cent. in lower numbers, but highest numbers less.	
Linen Tissues—			
Six threads or less to 5 millim.			
square	28 0 ...	28 0	
Seven and eight threads or less to 5 millim. square	28 0 ...	42 0 ...	+ 50
Intermediate numbers		Increased about 30 per cent.	
More than 23 threads	300 0 ...	460 0 ...	+ 53
Cotton Tissues, unbleached—			
11 kilog. and more to 100 metres square—			
30 threads and less in five square millim.	50 0 ...	62 0 ...	+ 24
31 threads and more in five square millim.	50 to 80 ...	100 0 ...	+ 25 to + 100
Seven kilog. to 11 kilog. to 100 metres square—			
35 threads and less in five square millim.	60 0 ...	95 0 ...	+ 58
Intermediate classes		Increased about 24 per cent.	
Three kilog. to five kilog.—			
27 threads and less	80 0 ...	230 0 ...	+ 187
28 threads to 35	120 ...	300 0 ...	+ 150
36 threads to 43	190 ...	410 0 ...	+ 116
44 threads and more	300 ...	625 0 ...	+ 123
Cotton Tissues—			
Velvets, unbleached	85 0 ...	143 0 ...	+ 68
Velvets, dyed or printed	110 0 ...	174 0 ...	+ 58
Other kinds (cords, moleskins, &c.) unbleached	60 0 ...	100 0 ...	+ 66
Other kinds, dyed or printed ...	85 0 ...	131 0 ...	+ 54

Articles.	Present Duties under Conventional Tariff.	New Duties under General Tariff.	Per Cent. Increase (+)
Silk Tissues—	Fr. c.	Fr. c.	
Tissues of Bourse de Soie, or } mixed with other materials ... }		Duties increased by 24 per cent.	
Paper—fancy paper ...	8 0	25 0	+ 212
Paper—other kinds ...	8 0	11 0	+ 37
Cardboard in sheets ...	8 0	11 0	+ 37
Arms—breechloaders ...	240 0	360 0	+ 50
Arms—barrels, unfinished ...	20 0	60 0	+ 200
Soap—scented, 100 kilog. ...	6 0	12 0	+ 100
Starch, 100 kilog. ...	1 50	6 0	+ 300
Bottles—full or empty, 100 kilog. ...	1 30	3 0	+ 131

From the foregoing statement it will be seen that in the case of several of the most important items of the British export trade the increase is from one hundred to two hundred per cent. upon the existing Conventional Tariff; and in the face of such an advance as this the negotiation of a Treaty that would be of any practical benefit to this country must necessarily be a most difficult task. A reduction of twenty-four per cent. on these rates would be absolutely worthless. The British Chambers of Commerce who have been consulted in connection with the proposed renewal of the Commercial Treaty are of the opinion that, even under the existing arrangement, the export trade from this country to France is cut extremely close by French competition, and that anything like a substantial increase in the duties levied on the other side of the Channel would amount to absolute prohibition. In 1876 the Glasgow Chamber reported that a material reduction of duties at the ports of France would be necessary "to enable Scotch manufacturers to carry on a trade of any importance in the export of goods to that country." The report added:—"The Chamber is also strongly of opinion that *ad valorem* duties should be maintained, and, where it is found possible, extended; and that any attempts to alter these into specific duties must have the effect of diminishing the trade between this country and France." The sub-committee who reported on mixed textile fabrics stated that they found "the French manufacturers to be their keenest competitors in the London, Manchester, Bradford, and Glasgow markets, clearly

showing that they can produce goods, particularly woollen dress fabrics, quite as cheaply, and more successfully than the manufacturers in this country." The Manchester Chamber was "at a loss to understand on what grounds the French spinners and manufacturers allege that they are unable to compete with the rivalry of our own country." The Chairman of the Association of Paper Manufacturers also urged the Foreign Office to press for some modification of the duty at present levied on British-made paper imported into France. (The practical reply of the French Government to this is an increase of about two hundred per cent. on fancy paper and about forty per cent. on other kinds.) In the case of steel and iron the New Tariff makes no serious addition, in fact the duty on steel bars and rails is reduced by about thirty-three per cent. But this concession really means nothing so far as British steel manufacturers are concerned, seeing that the rates in force are already prohibitory. These items do not at present appear in the list of British exports to France, and it is not likely that the small concession made by the new scale will cause any great revolution in the trade.

There can be no doubt that British industry has quite enough to do to force its way in the French market even under the Treaty now in force. Although England possesses some decided advantages as a manufacturing nation, there are at the same time certain drawbacks that must be taken into account. Wages are higher in this country than in France while the hours of labour are shorter, and these considerations together with the rigid enforcement of a law which regulates the employment of women and children, help to bring the competition to something like equal terms.

The contention put forward on behalf of the French Government that they are not actuated by any desire to raise the present duties on manufactured imports must certainly be accepted with a grain of salt. Of course, if the French executive finds it absolutely necessary to exchange *ad valorem* for specific duties, it is not for England or any other nation to complain in the event of such a change being carried into effect. An "inquiry into the best means of suppressing frauds upon the Customs," was sub-

mitted by M. Leon Say as one of the bases for negotiating a renewal of the Treaty, and if the Customs authorities have really found that frauds are being perpetrated to any considerable extent under the present system, it is clearly their business to provide a remedy. But at the same time it is the business of our Government to see that British interests are not signed away under a new Commercial Treaty. We cannot protest against the proposed change in the method of levying Customs duties, but we must take care not to assent to the performance of any sleight-of-hand trick in the course of the operation. The commercial relations between this country and France are just now in the midst of a grave crisis, and it behoves our Government to act with extreme caution in dealing with the question of negotiating a new convention. It would be a grave mistake to enter into any arrangement that would place British trade in a worse position than that which it now occupies. If the French Republic determines to adopt a protective policy we may not be able to avert the evil; but we can at least take care that we are not lured into signing away our freedom of action by means of soft words which signify nothing.

We have to bear in mind that the present Conventional Tariff sails close to the wind as a protection for French industry, and that anything like a serious increase would amount to absolute prohibition. The very lowest terms on which we can afford to enter into a new convention would be a continuance of the existing rates or their equivalents; and we ought absolutely to decline to accept any proposition that would have the effect of placing British goods at a greater disadvantage than they are now under. The assertion that no protection to native industry is implied by the new Customs Tariff must be received in conjunction with the general increase that has been made in the duties on all manufactures which are imported into France to any considerable extent, and, without wasting words upon the theoretical meaning of the revised scale, it is impossible not to perceive that it practically signifies prohibition to the foreign manufacturer.

The course adopted by the French Government with respect to the bounties on shipping, the readiness with which it took alarm at the possible introduction of trichinosis and prohibited the im-

portation of foreign pork, the perpetuation of the sugar bounties, and the careful regard shown for the health of the juvenile population by the recent prohibition of all foreign-made toys that are coloured with any kind of poisonous matter, all help to show which way the wind blows. Indeed there seems to be no interest that is too small or trifling to escape the paternal and protecting care of the Republic.

For the present the course of the English Government is clear. They have but to take care that no formal arrangement is entered into unless British trade receives a satisfactory *quid pro quo*. In one respect we are at a great disadvantage with regard to the negotiation of Commercial Treaties. England has adopted an almost unqualified free trade policy, the only existing import duties being retained solely for purposes of revenue. The consequence is that we have little to offer in exchange for concessions of the kind we are now seeking from France. But although we may not have much to offer it is necessary to remember that there is a great deal which it may some day be to our advantage to take away. Certain of the most important articles of export from France to this country would be highly suitable for bearing Customs duties in the event of any great and sudden expansion of the national revenue being required, and it is therefore very desirable that we should retain the power of levying such duties unless we obtain a substantial advantage in exchange for it. Since the Treaty of 1860 was signed England has not been engaged in any war that has made a serious call upon the Exchequer, therefore no great inconvenience has been experienced in consequence of our having parted with the right of increasing our revenue by raising the duty upon French wines or by placing a charge upon the silk manufactures which France sends to this country so largely. But this is a state of things upon which we cannot always reckon. It is uncertain how soon the time may arrive when the Chancellor of the Exchequer would be glad to have the opportunity of laying his hand upon the luxuries with which France supplies us, and in such a case the absence of any Treaty would be a decided advantage. French silk, wine, lace, and sugar, would all be fair game for the Customs in the event of additional revenue being required, and we

must be careful how we abandon the right of turning them to account.

There are some persons in this country who advocate a more active course of resistance than that of merely retaining our freedom of action. They would reply to the hostile tariff the French Republic has adopted by having recourse to retaliatory duties, and by entering upon a kind of protective contest. It is possible that there are individuals who are sufficiently sanguine to believe that weapons of this kind would be effectual as a means of securing free trade for both countries, and that they could be laid aside without any difficulty and at any moment. But if so, they are probably few and far between. The believers in retaliation are mostly believers in the efficacy of protection as a means of encouraging national enterprise; although they generally put forward their desire for what they term *real* free trade as the stalking horse for their opinions. Fortunately the country generally is by no means prepared to adopt this particular view of the question. Whatever course the French Government may take it is not likely that England will levy duties merely for the sake of checking the influx of French produce. At the same time, however, it is very desirable that she should retain her freedom of action in the matter, unless a Treaty can be concluded that would be a clear and unmistakeable benefit to her own export trade. The arrangement made in 1860 has no doubt been a beneficial one for the commercial interests of both countries. It was at least a step in the direction of the free interchange of commodities, and it will be unfortunate if France now determines to revert to a protectionist policy. Yet if the worst comes to the worst we shall doubtless survive the blow. We cannot, of course, afford to despise French custom; but the world's markets are wide and we can at least take care that we do not barter away our opportunities in return for any doubtful or shadowy advantage.

RECENT PAPERS ON STEEL SHIPBUILDING.

DURING the recent meetings of the Institution of Naval Architects, and of the Iron and Steel Institute, some valuable papers have been read, and important discussions have taken place, upon mild steel, the use of which is increasing so rapidly as to lead up to the conclusion that it will in a few years entirely supersede puddled iron as a material both for ships and boilers. The most important points treated upon have been:—1. Unaccountable failures in the material. 2. Methods of manipulation. 3. Liability to corrosion as compared with iron. 4. Commercial value of steel ships.

The increasing importance of the whole subject is shown by the fact that the tonnage of steel vessels classed in Lloyd's Register in successive years rose from 4,500 in 1878 to 16,000 in 1879, and to 35,400 in 1880; and in marine boilers under the notice of Lloyd's, while 3000 tons of material was worked up in the twelve months ended 30th April, 1879, and 4000 in the twelve months next following, as much as 7,500 tons of material was used in the last seven months of 1880. It is also said that at the beginning of the present year the total tonnage of steel vessels building was 114,000.

In a paper of which we gave the substance in our May number, Mr. W. Parker, the Chief Engineer of Lloyd's, furnishes a detailed account of some noted failures of steel plates used for the boilers of the Imperial Russian Yacht *Livadia*, experiences only to be compared with what had happened years before in the case of hard steel, and had prevented the general use of that material. The plates had all satisfactorily stood the tests prescribed by Lloyd's Registry, and further check tests made by Messrs. Elder, the builders of the *Livadia*, had proved equally satisfactory. The rivet holes were punched $\frac{1}{8}$ -inch less than the diameter of the rivets, the remainder being rimed out fair when the plates were put together. An accidental fall of one of the plates indenting it but not producing any sensible damage near the indent, was the occasion of a careful examination, in

course of which it was seen that the plates were cracked near the rivet holes. The steel makers considered that the plates were all injured by punching, and, before being rivetted up, they were all sent to the maker's works at Sheffield, and annealed in a furnace specially altered for the purpose. It may thus be presumed that the annealing was properly accomplished. One boiler made from the plates failed under hydraulic pressure; on the others being examined minutely before testing, the astonishing result was, that in one boiler the shell plates were found to be cracked before being subjected to any pressure whatever. The plates were then cut up for experiments, and it was found that all the steel near any punched hole was so brittle that pieces of it broke with but one blow from the hammer. At the same time, strips cut from parts of the plate not near any punched hole retained their original properties. It was, however, observed that in the latter case, although the strips stood the prescribed tensile strength and elongated to the required percentage before breaking, the fracture did not present the appearance usual in mild steel, but showed signs of lamination, a peculiar colour, and an appearance of crystallisation. Pieces of the plates were subjected to chemical analysis, the result being, that while the average composition was about what is usual, the carbon, manganese and phosphorus, were not uniformly distributed, indeed in one place iron almost chemically pure was found in the plate. Mr. Parker attributes the brittleness of the material after punching to its not having had sufficient work performed upon it in the process of manufacture, and this conclusion is borne out by the fact that in some cases where strips of bad plate were heated and rolled down to a much smaller thickness, the thin plate after punching did not exhibit such serious defects as it did when of its original thickness. Some steel plates employed for shipbuilding work by Mr. Denny, of Glasgow, have since failed similarly, and further tests made with them have shown similar results. It thus appears to be established that the tests for mild steel prescribed by the Admiralty, the Board of Trade and Lloyd's may be successfully borne by plates which nevertheless afterwards fail in working up. The only remedy which can be seen at present is that suggested by Mr. Parker as the result of elaborate investigation, that is, the

appearance of the fracture of test pieces should always be noted, and if it is bad, a strip from the same plate should be punched and the material then further tested. It must, however, be remembered that the number of these failures is exceedingly small as compared with the total amount of steel used for ships and boilers, and on the other side of the question must also be put the fact that mild steel has shown itself to be such an admirable material for working, that in some shipyards in cases of vessels built chiefly of iron, mild steel has been used for plates which had to be much twisted and bent because it could be depended upon for standing such treatment better than iron. An instance was also mentioned of a vessel stranding upon rocks when the steel plates of which she was built gave satisfactory proof of their toughness by merely being dented, under circumstances when ordinary iron ship plates would certainly have torn.

The future of mild steel depends much upon the manufacturer. It would appear that in the production of metal by either the Bessemer or the Siemens process, the essential feature of both being that the iron is refined in the fluid state instead of (as in puddling) in the semi-fluid or pasty condition, it is possible from neglect of some kind to produce as a result, a metal which is not merely a little inferior, but is altogether worthless. In iron ship plates we have all grades of excellence, in mild steel plates we only appear hitherto to have had the best and the worst. Happily the latter are extremely rare. Difference of opinion appears to exist as to the amount of rolling necessary to produce a good plate, but it is generally admitted that if the slab is not of such a size as to admit of its having a large amount of work done upon it before it is reduced to a plate of the required thickness, the result is of inferior quality. From what has been already done, we cannot doubt that mild steel of uniform quality will soon be produced at a considerable reduction in price, but the whole future of the new metal depends upon a rigid maintenance, accompanied however by an intelligent management of the prescribed tests. We believe that in the case of the Admiralty tests, the appearance of the metal at the fracture is always noted and included in the test reports, the consequence being that although the Admiralty use steel much

more largely than any mercantile shipbuilders, their experience of it is on the whole more favourable.

In connection with the working of mild steel, a valuable paper was read before the Institution of Naval Architects by M. Marc Berrier Fontaine. It is well known that in this matter, while the Admiralty were beforehand with private shipbuilders, the French Government were also a-head of our own, and their experience of mild steel is consequently longer than that of any one else. M. Fontaine describes how one by one they have abandoned many of the precautions taken by them in the work of their early steel ships. He tells how the difficulties caused by the inexperience of workmen with the new material have been overcome so that the very men who in the first instance could not satisfactorily deal with it, now prefer it to iron. In the French dockyards also the hammer is much less used than with us, hydraulic pressure being applied to all cases where the metal has to be bent to extreme curvatures or sharp changes of form. If the hammer is used the piece is afterwards annealed. Curved edges of plates are not permitted to be cut by a succession of punched holes, and circular saws which can cut steel cold are used to cut off the ends of bars, because the jagged cuts caused by other methods necessitate a subsequent trimming of the end by means of a hammer and chisel. Particular attention is also given to the tools of the workmen in order to avoid the larger number of blows necessary when using a blunt cutting implement in place of a sharp one. All who are interested in shipbuilding will gain much useful information from M. Fontaine's valuable paper, but we do not expect such refinements to obtain in any English shipyard, where profit or loss is necessarily the first consideration. It is however certain that English work and English methods of working in iron as well as steel are unnecessarily rough and heavy handed, and that more of the head and less of the heavy hammer would give better results both as regards the quality of the work produced and the pocket of the employer. It appears from M. Fontaine's paper that in the French dockyards they are returning to the use of the punch with mild steel for the rivet holes, and find it necessary to anneal after punching. We have always dis-

believed in the drill for shipwork, a plate which will not stand the punch is unfit to go in a ship, and if the punch injures such a plate in so doing it performs valuable service.

French experience also indicates in another respect the increasingly good quality of mild steel, as shown by the fact that the workmen now do not find it necessary to put in an iron liner between the two surfaces of steel to be welded, nor to use any special flux, but are able to weld mild steel as easily and successfully as iron.

With all their long, and in the main, successful experience of mild steel, the French Government do not even now use it for the skin plating of vessels below the water line. Their reason for this is, to use M. Fontaine's word's, "The uncertainty which still remains as to the behaviour of steel plates in sea water." The experience of the French Naval authorities leads them to believe that steel plates when wetted with sea water corrode much more rapidly than iron, and that the corrosion is more active in warm than in cold water. A gunboat named the *Tromblon*, launched at Toulon, in 1875, remained afloat only nine months, during which time it was found necessary to dock her every two months to paint the hull, in consequence of the rapid corrosion of the plates, especially those near the water-line. The corrosion was not uniformly spread over the surface, but took the form of a series of pittings of such depth that if unchecked they would soon have been through the plates which were about a fifth of an inch thick. It was ultimately found necessary to haul the *Tromblon* up out of the water, but this experience has been deemed conclusive as regards the use of steel for bottom-plating in French war ships. Another gunboat, the *Epée*, had steel bottom-plating which also became much corroded, but not so seriously as that of the *Tromblon*. The difference is attributed to the fact that the *Epée* was lying at L'orient, where the water is brackish, and is colder than at Toulon. We have, in a former paper, referred to the Admiralty experiments in reference to the corrosion of mild steel, and to their conclusion that where rapid pitting had occurred it might be traced to galvanic action between patches of black oxide on the surface of the plate, and the exposed part of the steel itself, the steel being

electro-positive as regards the black oxide. The galvanic action in this case was found to be as rapid and as destructive as that between iron and copper, and in consequence of the conclusion come to on the subject, the Admiralty now carefully remove all the black oxide from their plates by pickling before they are worked into the ship. The black oxide is the scale formed upon plates in the course of manufacture, and if it were only uniform and constant, and afterwards remained unperforated, it would protect the steel from the action of sea water. It is, however, impossible to retain it intact, and the next best thing is to remove it altogether. Where ships are built in places exposed to the weather most of the scale peels off.

It may, we believe, be safely concluded that wherever corrosion takes the form of pitting it is a consequence of galvanic action, and there appears to be little doubt that galvanic action may result from a want of uniformity in the composition of a plate. Mr. Denny, of Glasgow, a year ago made public reference to some serious pittings of steel plates in the case of a vessel which had been running upon the river Irrawaddy; he has recently stated that in other similar vessels in the same waters nothing more of the kind has taken place. Further investigations on the question of the relative durability of iron and mild steel have recently been described in a paper read before the Iron and Steel Institute by Mr. Parker. Seven different kinds of iron plates and four of steel were selected for experiment. Half of the whole number of pieces of each kind were turned bright all over, and the remainder only on the edges leaving the scale on the flat. Separate series of pieces were placed under similar circumstances, one being suspended in water in the open sea, another kept in the bilge water of a steamer, others hung up in marine boilers under the water level. The result was that the corrosion of steel was found to be slightly in excess of that of iron. In the discussion which followed Mr. Parker's paper, much was said upon the subject of corrosion, the balance of opinion being that steel was not less durable than iron. Probably such is the case as regards ordinary corrosion, and the cases of pitting may be all due, as we have said, either to the presence of black oxide or to a want of uniformity

the composition of the metal. It would, we would suggest, be a valuable experiment to suspend the pieces of the defective plates and in the *Livadia's* boilers in sea water in company with some pieces of good metal, and observe the relative corrosion.

Some time ago we referred to some statements made by the Chief Surveyor of Lloyd's Registry as to the commercial value of steel as a material for shipbuilding. Mr. Denny, whose experience in the matter is probably as large as that of any shipbuilder, believes that steel ships have an economical advantage over iron ones, but not to so large an extent as that put down by Mr. Martell, whose remarks upon the subject were based upon the assumption that a saving of weight to the extent of 18 to 19 per cent. would be effected by the substitution of mild steel for iron. Lloyd's rules allow a reduction of 20 per cent. in the weightings of most parts of the structure. One reason why the percentage of saving in total weight proves less than might be supposed is that in the case of deck-houses, bunkers, &c., no advantage would be gained by using steel, since no reduction in weighting is practicable. In stems and other forgings, although mild scrap is used, no reduction is made in size. There is a further consideration that the specific gravity of mild steel is $2\frac{1}{2}$ per cent. greater than that of iron. From these and other causes the actual saving in the total weight of the ship is found to be between 13 and 14 per cent. On this basis, Mr. Denny goes into details as to the cost and extra dead-weight capacity of a large passenger steamer supposed to be built for the Calcutta route, and arrives at the conclusion that the extra cost of the steel would be cleared off by extra freight due to increased carrying power in two years. Of course passenger steamers going long voyages are just those where the advantage of an increase in cargo capacity unaccompanied by any decrease in speed tells most. They are to take a large quantity of coals, and the cargo being comparatively small, an increase in total dead-weight capacity becomes a large percentage on the weight of the cargo. As might be expected, the leading lines upon eastern routes, such as the Peninsular and Oriental, and the British India Companies are adding steel steamers to their fleets.

It does not appear that the extra cost of steel for shipbuilding is to be put down to the process of manufacture being more expensive than that of iron, but rather to the high quality of the article which is kept up by the tests. The Admiralty have always had their shipbuilding iron rigorously tested, and their experience is that they can obtain steel plates to stand the tests at a less price than they formerly paid for iron ones. From a current price list of materials, we see that at present Bessemer steel rails touch the price of iron rails of superior quality. We do not think such will be the case with ships plates for a long time. The reduction in scantlings given by the Registries is given because with a material of greater tensile strength and of more uniform quality, such reduction is warranted. The quality of steel can only be secured by rigid and careful testing, and the faithful and intelligent carrying out of such testing can alone justify the allowance of smaller scantlings in ships built of mild steel.

STATEMENT OF NAVIGATION AND SHIPPING OF THE
UNITED KINGDOM FOR THE YEAR, 1880.

THE return of Shipping Statistics for the year 1880 is not, as has been the case in recent years, prefaced by a report from Mr. Giffen to the Board of Trade. Although we are entitled to take credit for having anticipated Mr. Giffen in many of the inferences and deductions set forth in his reports on shipping, we regret at the same time that these Annual Reports have ceased all too soon, and that this country has lost the advantage of Mr. Giffen's presence in a department for which he was admirably adapted.

The leading characteristics of the British Mercantile Marine as pointed out in our columns for June last still continue. The transitions from sailing to steam motive power; from wood to iron, and iron to steel material are becoming more rapid, and although there is a small decrease in the number and tonnage of

British registered vessels, there is an enormous increase in their carrying power. The number and tonnage of vessels on the register at the end of the year 1880 were as follow :—

	Sailing.		Steam.		Total.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
United Kingdom	19,369	3,799,229	5,235	2,730,551	24,604	6,519,772
British Possessions	12,667	1,698,668	1,668	238,731	14,335	1,927,399
	32,036	5,497,897	6,903	2,969,282	38,939	8,467,171

When compared with the statistics of the year 1879, the above figures show a reduction of 352 vessels and 15,193 tons. This reduction is made up by the difference between the increase of 274 steam-vessels and 216,013 tons, and a decrease of 626 sailing vessels and 231,206 tons, but if the superior carrying power of steam tonnage were taken into account, it would be found that instead of the apparent decrease of 15,193 tons there has been an actual increase of about 630,000 tons. The increase is, however, almost entirely confined to the shipping registered in the United Kingdom, there being an actual decrease in Colonial sailing vessels, whilst the increase in Colonial steam-vessels is scarcely perceptible.

The table of vessels built in the United Kingdom during the year 1880, shows very clearly with what increasing rapidity sailing vessels, especially those built of wood, must decline from inanition. The existing sailing fleet registered in the United Kingdom amounting to 3½ millions of tons was recruited in 1880 by the addition of 57,534 tons against 59,153 tons in 1879, and 141,221 tons in 1878, whereas the existing steam fleet registered in the United Kingdom was recruited by 346,361 tons in 1880, against 297,720 tons in 1879, and 287,000 tons in 1878.

The number and tonnage of vessels *employed* in the Home and Foreign trades show a distinct improvement on previous years, there having been an actual increase of 95,000 tons; but when it is remembered that this increase in the actual tonnage arises from the increase of ½ million steam tons compared with the total decrease in the sailing tons employed, it will be understood that the working increase is enormously greater than at first sight appears.

The decrease in the employment of sailing vessels is confined

to vessels of the medium size, there being an increase in the number of very small and very large sailing vessels employed.

Although the transition from sailing to steamships has some aspects which are not altogether favourable to British shipping, and particularly to British seamen, there is great reason for satisfaction in the reflection that generally the change has been in favour of this country as against foreign countries and even as against some of the British Colonies.

The great wooden sailing fleets of Norway, the United States, and unfortunately of the Dominion of Canada, are at a standstill with but slight hope of progress in the future. Year by year owners of sailing vessels complain that the avenues of commerce are entered and monopolized by steamers, which they are bound reluctantly to admit do their work more expeditiously, safely and economically than sailing ships. The advantage at present is on the side of this country and may with prudence be retained.

The entries and clearances of British vessels at ports in the United Kingdom amounted to 54,550,838 tons, showing an increase in one year of $2\frac{1}{4}$ million tons, and in two years to over $4\frac{1}{2}$ million tons. As might be expected the increase was entirely confined to steamers.

The entries and clearances of foreign vessels at ports in the United Kingdom amounted to 9,550,000 tons, showing an increase of 1,173,535 tons of which 435,000 tons belonged to steamships, but the increase is abnormal and only places foreign vessels very slightly ahead of the position which they held prior to the depression of 1879. About 15 per cent. of the total trade and about 30 per cent. of the foreign trade of the United Kingdom is carried on in foreign vessels.

Notwithstanding the increase in the Mercantile Marine, the number of hands employed continues to decrease, but it is satisfactory to observe that the decrease has taken place in the number of foreigners employed, only 13.72 per cent. of the 192,972 seamen (excluding masters) being foreigners, against 14.43 per cent. of the 193,548 seamen employed in the previous year. The year 1880 records the first check which has been put upon the increasing employment of foreigners for many years, but the fact

may be accounted for by the slight revival of foreign commerce enabling foreign seamen to obtain employment in the ships of their own countries. In an analysis of the crews of 35 sailing vessels and 25 steamers belonging to well-known firms, the number of men carried to each 100 tons were found to be as follows at decennial periods :—

No. of Crew per 100 tons.

	1870.	1880.
Steamships	4.4527.	3.8627.
Sailing ships	2.4189.	2.2644.

The average number of seamen per 100 tons carried in all British ships is, however, much lower than the favourable examples chosen, and indicates a still more rapid decrease in the number of hands employed :—

No. of Crew per 100 tons.

	1870.	1880.
Steamships	4.67.	3.25.
Sailing vessels	3.25.	2.90.

The steamers selected for the special analysis belonged to some of the best firms, and were better manned than the majority of steamers afloat, but it is curious to note that more than one-fourth of the crews in question consisted of firemen and engineers, and another one-fourth were nondescript, consisting probably of stewards and other servants. At the same time it is to be regretted that there is a decrease in the number of apprentices enrolled out of proportion to the natural or rather actual decrease in the number of British seamen. As a consequence of this state of things it was reported by the Superintendent at Poplar, that "there had been a limited supply of men throughout the year. Masters managed to fill up their crews (sometimes with difficulty) but had no choice."

BIZERTA, BENI-ZART, OR BENZERT.

THIS place, which was once a city of great strength and magnificence, and to which so much attention has lately been directed through the French occupation of part of the territory of the Bey of Tunis, is described in the Journal of the Royal Geographical Society of 1846—a survey of its vicinity together with its lakes having been made by Lieut. (now Admiral) Spratt in 1845. More recently (1874-5) it has been visited by officers of the United States Navy, and the following observations are based on their reports, being a description of the present condition of the town and its lakes, together with sailing directions for the roadstead or bay.

Bizerta Bay and Roadstead.—Cape Il Guerra is the extremity of a ridge of very irregular heights in which the mountains forming the coast to the westward terminate. The cape itself is low and rocky with foul ground extending off two cables, where the depth is 5 fathoms. Cape Zebib is $10\frac{1}{2}$ miles E.S.E. of Il Guerra, and these two capes are respectively the eastern and western limits of Bizerta or Benzert bay, which recedes $3\frac{1}{2}$ miles. From the extremity of Il Guerra to Bizerta town and canal, the shore trends S. by E. $3\frac{1}{2}$ miles; it is low and generally sandy, but fringed with foul ground, and overlooked by the ridge which extends down to the cape, leaving between its eastern slopes and the waters of the bay a narrow cultivated plain. Half-a-mile north of the town there is a rocky hummock rising abruptly from the water's edge and having fort Salem on its summit. A fortified wall encloses the town and extends up the hill slopes to a large citadel, the most conspicuous object near the town. The forts which stand at the water's edge and at the canal entrance, nearly mask the town. At $2\frac{1}{2}$ miles south of Il Guerra is the most salient part of the shoal ground fringing this shore; it is a ledge of rocks with 2 feet water over its shoalest part, extending east and west 2 cables, and surrounded by depths of 10 to 12 feet, which extend out nearly half-a-mile, where the depth changes to 4 fathoms, and then gradually to 8 fathoms at three-quarters of a mile. The west edges

of fort Salem and the citadel in range lead clear of this danger. When the anchorage is approached from around Il Guerra, keep the town well open off the starboard-bow until this fort and citadel come in range, when you may head towards the town and anchor anywhere east or N.E. of it in any suitable depth from 4 fathoms, at 300 yards from the piers, to 12 fathoms at a mile off. The bottom is sandy with patches of weed ; good holding ground.

The Town of Bizerta—The Canal and Lakes.—The town contains about 5000 Moors and Arabs, 500 Jews, and a few Europeans ; it is built at the mouth of a canal once deep enough to admit the largest vessel, but now silted up to 3 feet in the entrance, and between 5 to 10 feet wide within. The piers, which extend a cable eastward from the forts, have been partly destroyed by the sea, and the quays which line the canal within are gradually falling in. At 500 yards within the entrance is the north end of an island which divides the canal into two branches, both crossed by masonry bridges, forming a part of the town wall. These branches lead into a shallow sheet of water which extends half-a-mile southward and is separated from the sea by a very low strip of sand. This sheet of water communicates with a natural channel $3\frac{1}{2}$ miles long, in a N.E. and S.W. direction, having a width varying from half-a-mile to $1\frac{1}{2}$ miles, and a general depth of 7 fathoms ; and this channel leads into Bizerta lake, a body of salt water 8 miles long east and west, and 5 miles north and south, in which the general depth is 6 fathoms. Two miles westward of Bizerta lake there is a large body of fresh water, with a general depth of 6 feet, a length of 8 miles, and breadth of 2 miles, into which many streams empty. A navigable but narrow and tortuous passage leads from the fresh to the salt water lake. On the south side of the fresh water lake there is an island $4\frac{1}{2}$ miles long east and west, which rises rapidly to a high ridge extending through the middle ; this culminates in a cluster of ill-defined peaks, the highest 1,740 feet above sea level, and visible from a long distance in the offing. This lake and the island are named Ishkel. On the south shore of the island, a mile from the east end, there are several thermal springs. The

neighbouring country is rolling hills and low plains, considered the most fertile region of north Africa, and peopled by a mild and hospitable race, all Mohammedan, employed in agricultural pursuits. Game (partridges, quail, snipe, duck and woodcock) abounds in the immediate vicinity of the lakes, which swarm with a variety of fish of the best quality. The right of fishing is sold by the Bey to one man, who has constructed weirs across the shallow passage leading from the channel into the sheet of water which communicates with the canals; the fish enter the weirs, are imprisoned in chambers, and caught at leisure for exportation. To these weirs is due the silting of the channel.

Bizerta exports cereals and olive oil direct to foreign ports, but its imports are almost all through Goletta, Tunis bay. The commerce of the port is carried on by small sailing craft, and chiefly with Italy and France. Poultry and vegetables are abundant and very cheap; beef and mutton may be procured at moderate prices if a day's notice is given. Neither mechanics nor material used in the construction and repair of vessels are to be found at Bizerta. Water of good quality may be filled from cisterns in the town. Coal and sea stores are not to be had. Consular representatives of the different European States, and of the United States, reside at Bizerta. There is telegraph and daily communication with Tunis; the latter is by caravan, usually laden with fish, in about 12 hours.

Landing is difficult when the wind is north of east and N.W., and frequently communication with the shore is suspended for several days in succession. A fleet of French corallers rendezvous at Bizerta, going out to the bank off the mouth of the bay when the weather permits. The town is a mass of unsightly masonry buildings, huddled together without order, and separated by unpaved, filthy narrow passages. The inhabitants are courteous, amiable, and kindly disposed to Christians. There is no sickly season, and the summers are much cooler than any accessible point on this coast. French or Italian is spoken by the Europeans residing in Bizerta. A French physician resides there (1876). There are no pilots. The eastern shore of Bizerta bay is overlooked by a ridge between 600 and 900 feet in height, with even

slopes, covered with low brushwood, and devoid of buildings of any kind. The north end of the ridge slopes towards cape Zebib, which is formed by three round hummocks, with a downward curve between them and the ridge; the cape terminates in a very low rocky point, extending out 100 yards from the foot of the outer hummock; a ledge of rocks extends out 100 yards farther, below the surface. The cape should not be approached nearer than half-a-mile, but all dangerous depths will be cleared by keeping the passage between Pilau islet and Farina cape closed, S.E. by E. $\frac{1}{4}$ E. The shore between Bizerta and cape Zebib curves around to the eastward, is low and broken, in some places sandy, in others rocky, and generally clean, with 4 to 5 fathoms within a cable, and 10 fathoms at half-a-mile. Eastward of the narrow strip of sand separating the lake from the sea the head of the bay is backed by a cultivated ridge about 200 to 300 feet high; farther eastward there is a lower and barren ridge of sand, which shows very white from the offing; and eastward of this again is the ridge which extends to cape Zebib.

PERNAMBUCO, BRAZIL.

PERNAMBUCO, on the east coast of Brazil, has come to be one of the most important ports of that country. Not only has it a large commerce of its own, but it is now a port of call for vessels traversing the Atlantic to northward and southward. The commercial community, believing the harbour and roads to be capable of improvement, have frequently had the opinion of engineers on this subject; now, however, they purpose setting to work in earnest, and we are enabled to give an abstract of the report of Colonel Milnor Roberts, who will probably be engaged to carry out the required improvements.

“The principal recommendations that have been made are—dredging of the harbour, to obtain greater depth, and more area for the shipping inside; extensive breakwaters outside of the reef, to transform the roadstead into a port; raising the submerged reef north of the Picao channel entrance, to protect that portion of

the harbour called the Poco anchorage from the swell of the sea; new quays along the city front, to be built in deep water, requiring dragging; repairing, raising, and strengthening the surf wall on the reef; cutting a new channel for the river south of Cinco Pontas; constructing culverts to create more waterway for the floods, closing the Picao entrance; leaving open and protecting the Picao entrance; closing the head or south end of the harbour by the Dyke do Nogueiro; leaving this south end open; sheltering the Poco anchorage by a breakwater on the submerged reef; prolonging the high reef from the lighthouse to the Tartaruga rock; destroying the submarine rock in the Barra Grande; making a dock at the east side of the quarter St. Antonio; improving the rivers where they are shallow; cutting a new outlet for the river at Fort Brum; building extensive docks and quays near Fort Brum; constructing a curved dyke from the proposed new river channel to the Cabeça do Coco, a submerged rock on the north side of the Barra Grande; excavating a deep ship-channel through the Passarinhos shoal, and building wharves between Recife and Cinco Pontas; stopping the Barreta das Jangadas; deepening the Barra do Picao; building a quay from Cinco Pontas to the Caes do Collegio for the benefit of the railway company; continuing the Arsenal quay northward beyond Fort Brum; reclaiming a large tract of land near the Recife railway station; canalising the Capiberibe river up to the Magdalena bridge; providing quays for vessels of all sizes, including the making of a quay on the outer reef, with a bridge near the Barreta das Jangadas at the southerly end of the port; building a floating basin between the quarters of Recife and St. Antonio; protection against damage from the floods of the Capiberibe and Beberibe by means of new outlets. Other schemes have been proposed.

"I may state here that all of these various plans have been carefully investigated by me.

"I think that the most needed improvements are the dredging of the Breguede shoal and other dredging in the port, raising the submerged reef between the Barra Picao and the Barra Grande, either closing or improving the Picao entrance, and improving the present shipping arrangements by means of

short open iron piers, at the quays, and dredging in front of them.

"Respecting the probable cost of the works I shall recommend, I can only state at present that it will be much less than most of the plans heretofore offered.

"An opinion was expressed some years ago by a distinguished engineer, and has since been repeated, that 'Pernambuco has a good harbour with a poor roadstead.' I do not concur in this view of the roadstead for I regard it as an uncommonly good one.

"The occurrence of any trouble to the large vessels anchoring in the outer roads of Pernambuco is very rare. The port is perfectly secure but it is of limited capacity, both in depth and area. The primary object should be to increase its depth by dredging, and at the same time to enlarge the shipping area for vessels drawing $6\frac{1}{2}$ to 7 metres (23 feet).

"Many of the former recommendations were very judicious, but so much was attempted to be embraced in the schemes as to render the estimated cost so formidable as to deter the government from undertaking them. Besides, for a very large proportion of all the vessels trading with Pernambuco, this port is already one of the safest and one of the most convenient in the world, and for the very large vessels which cannot enter the port there is an admirable roadstead.

"Nevertheless, the business of the port is increasing, and still better and large shipping accommodations are desirable.

"Pernambuco is situated near the most extreme easterly part of Brazil, and near the track of vessels sailing north and south, so that it is remarkably favourably placed as a calling port."

The latter part of this report will be especially valuable to shipmasters, inasmuch as it is applicable to their wants in the form of sailing directions, and on that account will be appreciated.

THE INSTITUTION OF NAVAL ARCHITECTS.

(Continued from page 390.)

THE USE OF MILD STEEL FOR SHIPBUILDING IN THE FRENCH DOCKYARDS.

By M. MARC BERRIER FONTAINE, Chief Constructor of the French Navy.

AFTER referring to the numerous papers which have been written on mild steel and its applications in this country, the author described the parts played by France and England in the manufacture and development of mild steel, and its employment for shipbuilding amongst other work. He then went on to describe the chief elements of successful manipulation of mild steel, the principal of these being the necessary great skill on the part of workmen, who need to be encouraged in spite of the failures due to the want of experience in dealing with the new material. He next went on to consider the importance of having special tools for dealing with mild steel for shipbuilding, and especially of mechanical arrangements for taking the plates from ovens and quickly depositing them on the tables or dies upon which they have to be shaped, so that the work may be done without hurry and whilst the plate is still red-hot. Much stress was laid on the use of gas ovens on the Gorman system instead of furnaces on Siemens' system for heating plates for hot bending, the Gorman oven being simpler in construction and management. At Toulon, as soon as a piece of metal is brought to a fitting temperature, it is seized in the oven by pincers, to which a rope is made fast, which, passing over other return pulleys, passes to one of two capstans. A workman starts this by pressing his foot on a lever close to the ground, a few turns of a Brotherhood engine being enough to get the piece thus drawn on to the plates alongside of the guides upon which it is to be moulded; one of its ends being quickly fitted against these guides, the other end is clutched by a claw which is hauled upon by a cord seized upon one of the capstans. Wooden mallets and swages are used for almost all the work, but when excessively sharp curvatures, &c., are needed, and hammers have to be used, the work is afterwards

carefully annealed. Annealing is not otherwise resorted to, as the work is still at a colour heat when finished.

The use of hydraulic presses gives the most satisfactory results when applied to the work of fitting and moulding angles or other work with sufficiently open curvature to admit of their being done cold. This is the case with all the deck beams, as well as for the greater part of the angles of the longitudinal stringers, and also for a very large proportion of the angles of the frames. At Toulon this work is performed by presses of graduated power from 5 tons to 100 tons, some verticle, some horizontal, to suit all possible cases. One press of a hundred tons is quite sufficient for straightening and moulding double Tee-bars of iron of $350 \times 150 \times 15$ mm., and of steel bars of $300 \times 148 \times 14$ mm. The profiles of these are among the most rigid forms of all those yet dealt with. A press of 50 tons is sufficient for straightening and moulding almost all the other forms used, from that of H or double Tee-bars of steel of $250 \times 130 \times 10$ mm. Finally, the small 10-ton presses can easily mould steel angles of $150 \times 150 \times 15$ mm., and 5-ton presses will mould steel angles of $120 \times 120 \times 12$ mm. The consideration of the effect of ragged holes and punched edges has led the authorities to forbid the use of the punch for making cuts in the plates, whether straight or curved, by a string of holes. In that respect the exceptionally large stretch of the Toulon hydraulic shears, which is 1.50 metre, or 5 feet, allows the shearing of the largest plates in any direction, and to cut sheets of any length up to 3 metres wide straight across. Curved cuts are obtained at once by means of a series of blades having graduated curvature, and brought sufficiently close to one another for them to cut out with sufficient exactness all shapes which can occur, whatever be their curvature. A collection of bent blades of this kind makes an outfit which is extremely valuable. The cutting edges of these blades are spiral, as in Kennedy's spiral punch, thus having a shearing action. For splitting the ends of channel and other bars in the way often required for junctions with deck and flooring framings in ships, shears which are really long narrow punches working in long slot dies are employed. Cutting thus takes place on both edges, and the bars are not distorted. It may be said generally

that the tools which carry out the most exactly the work which has to be done, whatever it may be, are at the same time those which least upset the neighbouring portions of the pieces of work upon which they act. Care is taken that the working angles of these different tools are set as may be most suitable for each kind of work. The most rigorous and the most unceasing attention is given by the foremen and by the workmen themselves to seeing that the cutting edges of their tools should always be kept in the most perfect condition. In order to secure this, grinding machines, with artificial emery grindstones specially arranged for setting the tools of various forms, are largely employed; these machines securing a regularity and a precision of edge which it would be impossible to obtain by hand. These emery grindstones are also used for taking off burrs, and finishing both plate work or moulded bars, as well as in finishing the small forged pieces, such as ring bolts, staples, hinges, and so forth, which form so large a part of modern construction. A saving of 22 per cent. has been found to be the result of long-continued trial of twist drills properly ground with emery wheel machines. The improvements in the results obtained by great care in every phase of the making of plates and moulded bars of steel, has led the Constructors of the French Navy to consider the desirability of relaxing, by slow degrees, the severe requirements which had at first been imposed by them for the execution of work of every description to which the plates and moulded bars of steel should be submitted in the dockyards. The cases in which it is judged necessary to anneal steel plates and moulded bars are now incomparably less frequent than they used to be a few years ago, and the number is still undergoing daily reduction. A return by degrees is being made to the use of the simple punch, without annealing, and without riming, for cutting holes in almost all the pieces of framework of the new constructions, reserving the use of the drill for those pieces only in which there is special reason for keeping up the greatest possible strength, having regard to the more important position that they have to take in the construction, or the exceptional strains they may have to bear. The vigorous precautions which the want of homogeneity at one time enforced are being discarded, and the

most recent trials appear to prove that the loss of strength in punching and working is not much greater for steel than for iron. M. Fontaine therefore with very cautious enthusiasm remarks :—
“ It seems to me, therefore, to be beyond doubt that at no distant period—as soon as the breakage of steel work becomes sufficiently rare not to require greater precautions in working these pieces than those which are applied to iron, that is to say—we shall very soon get into the way of punching nearly all the steel plates and moulded bars, and of only annealing them in exceptional cases, when they may have been submitted to very violent, and very trying deformations—a treatment, in fact, precisely similar to what we give to iron under the same circumstances.” Owing to the more complete homogeneity and ductility of the steels, and also to the increased practice workmen have acquired with the new metal, the welding of steel plates and bars can now be effected as easily, as simply, and as satisfactorily as that of similar work in iron, without, M. Fontaine says, its being necessary to have recourse to any special process or to the use of any particular flux. “ A great number of weldings of steel plates and angles have been broken as tests, and the results of these tests, in which the fracture often takes place outside the weld, have finally led us to consider the welding of thin plates of steel as being as certain and perfect as that of similar pieces of iron.”

The author stated that the tensile strength demanded and the inferior limit imposed by the French authorities for steel plates and bars of various section were not the same for all thicknesses and sections, but were greater for the smaller and thinner sections. Excluding boiler iron, for which an exceptional amount of ductility is considered indispensable, the inferior limit of tensile strength required by the French Navy is as a general rule higher than that specified by the English Admiralty, by Lloyd's Registry, and even by the Underwriters' Registry. It is only, in fact, for the thicker plates of from 20 to 30 millimetres, and for the stringers and butt-straps of all thicknesses, worked across grain, that the French Navy allows a low limit of 44 kilogrammes per square millimetre, or of 28 tons to the square inch. This is specified for, all through by the Underwriters' Registry for all steel used in the hull. As the

thickness of the plates diminishes the inferior limit required in the French Navy increases progressively, and for plates of from 6 to 20 millimetres in thickness, which includes nearly all those used in modern constructions, this limit already exceeds by 1 kilogramme per square millimetre that of the Liverpool Society. In order to be accepted for use in the French Navy, thin plates from 1 to 4 millimetres thick must be subjected to a minimum test of 30 tons to the square inch, or 47.25 kilogrammes per square millimetre, while the minimum tensile strength of the stringers and butt-straps tried along the grain, and that of bars of all sections with the exception of double Tee-bars, Tee-bars, and bulb-iron, should be of a still higher tensile strength, namely, 48 kilogrammes in place of 47.25 kilogrammes per square millimetre. In the French Navy there is no superior limit to the tensile strength of steel presented for acceptance, so that the total effect of the conditions required by it has had the effect of furnishing it with steel plates and bars having an actual tensile strength very considerably in excess of those of the similar pieces of steel which are used in the same work in the building yards of Great Britain. This superior tensile strength is not bought in the French Navy at the cost of a reduction of ductility in the steel there employed, for a minimum elongation of 20 per cent. is demanded.

As regards the calculations of tensile strength, it appears from the results of the numerous experiments that a mean figure of 48 kilogrammes per square millimetre, representing the ordinary breaking strain of steel plates and moulded bars such as are actually used in the French Navy, is adopted. The usual breaking strength of the iron plates and moulded bars of ordinary and common quality which are delivered to it, cannot, on the other hand, be regarded as greater than 36 kilogrammes per square millimetre at the outside. For iron a factor of safety of 6 is used. Using the same factor for steel it is reckoned that plates and moulded bars of this metal may be safely loaded with 8 kilogrammes per square millimetre. The limiting loads of 6 kilogrammes for iron and 8 kilogrammes for steel, are to one another as 1 : 1.33, consequently the inverse ratio of 1 to 0.75 indicates the reduction of thickness, and therefore of weight, which the substitution of

steel for iron allows us to introduce into the plates and moulded bars which we use. This corresponds to an economy of 25 per cent. in weight. In order to take account of the loss of strength experienced during the work—a loss which may well be of greater relative importance in steel than in iron—and in order to take account of the existence of an inferior limit below which we cannot reduce the thickness of steel plates without risking their buckling, and although there does not exist any general formal rule about this, the Constructors of the French Navy, in agreement with the authorities of Lloyd's Registry, think that it is not safe to reckon on a final saving of more than 20 per cent. in the replacing of iron by steel in the weight either of the whole hull or of any part of it.

M. Fontaine then described at some length the experiments by the French Navy, which have shown steel corrodes more rapidly than iron, and he concluded:—"It would not be safe to affirm very positively, for instance, that this extremely rapid corrosion of steel plates is solely due, as Mr. Barnaby assumes, to intense galvanic action arising between the metal and the black oxide by which it is covered, and that consequently it will be sufficient to clear the plates of this black oxide by means of a weak acid bath in order to make their oxidation in sea-water slow and uniform, like that which usually takes place on the surface of iron plates. It could not be affirmed with any certainty either that the greater or less rapidity with which steel plates are attacked by rust depends solely on the greater or less proportion of manganese which they contain, as has been suggested by Dr. Siemens in 1878, in a paper read before the Institution, a suggestion, however, thrown out with some degree of doubt. Finally, it cannot be affirmed, as has been recently stated before another society, that the corrosion of iron and steel plates is the more slow and regular in proportion as those plates contain a greater proportion of carbon or phosphorus, and that it is consequently not possible to find plates which possess the necessary ductility in combination with the valuable property of being attacked by rust only in a slow and regular manner when exposed to sea-water." The French contractors consider that the cases in which steel rivets have

hitherto been used do not seem to them sufficiently numerous, nor does the experience which results from them appear to them to have been sufficiently extended, nor sufficiently conclusive, to allow them to consider themselves in a position to dispense with the use of iron rivets.

The discussion on this paper was opened by Dr. Siemens, who repeated that mild steel corrodes no faster than iron, while others hold to the general sense of the above remarks of M. Fontaine. He also spoke of the rapid corrosion caused by the use of two metals such as steel plates and iron rivets. He also quoted some recent experiments by Professor Kennedy to show that mild steel was increased in strength by punching. Mr. White remarked that in punching strips it was well known that the material which was left at the sides was stronger as the hole was larger, as though the material was strengthened by the strain imposed, as iron or steel rods are by slight stretching. He also referred to the very complete machinery used by M. Fontaine for working steel cold, and to the numerous sections in which steel could be obtained in France, making hot work less frequently necessary. Mr. West said that pitting was often the result of the mechanical removal of paint covering, and that after a time corrosion gradually grew less and was no more than in iron. Harder steel, he observed, was gradually coming into use, and had increased in use since his paper on the subject.

ON LOCAL EDUCATION IN NAVAL ARCHITECTURE.

By Mr. W. DENNY.

The object of Mr. Denny's paper was to draw attention to the necessity for local education in naval architecture, for the large class in some districts of young naval architects and draughtsmen who are unable to attend the Naval College, and to whom the examinations conducted by the South Kensington Department are almost wholly useless. "To educate the majority of our rising naval architects, we must bring the necessary education to their doors, and enable them to obtain it concurrently with their everyday work. On this account, I think it is the duty of the Institution to express some opinion on the manner in which the South

Kensington examinations are at present conducted, and to press upon the Government, if defects can be shown to exist in these examinations, that they should be remedied promptly and effectually." A curriculum is arranged by the South Kensington Department which is spoken of as follows by the teacher, a gold medallist, of Dumbarton, who is also the head draughtsman of Messrs. Denny's firm :—"The teacher has to follow so very closely the line indicated by the questions put in each year's examination, that there is little or no time to digress for the purpose of treating matters very important in themselves, but which are not among those required by the department. A large amount of time is occupied in describing to the pupils of elementary, and indeed all the stages, matters with which they are never likely to have any practical acquaintance, and thus a good deal of the instruction becomes mere cram, the imparting of really useful information being sacrificed to the preparation of the pupils to meet the examination." In order to give some idea of the examinations arranged by South Kensington, Mr. Denny summarised the papers of 1878-79 and 1880. These showed that the chief subjects relate to wood and composite shipbuilding.

The retention of these and other subjects, which are to all intents and purposes archaic, crushes out more important elements, and excepting the questions in iron construction, which have a practical bearing, there are very few of present importance and interest. The important omissions include :—The strength of sections of steamers, involving the calculation of the neutral axis and moment of inertia of these sections. The stability of vessels treated even in the simplest form, with reference to the metacentric height, and its alterations by the combined influences of change of draught and vertical change of weight. The speed and power of steamers, Mr. Froude's law of proportional resistances and speeds, and Mr. Inglis's application of that law to the actual results obtained from speed trials. Besides these, there is the matter of trim, too often neglected in the designs of merchant steamers. How important for a pupil to know how to predict the effects on trim of coal consumption, of the addition or removal of ballast, of the fore and aft disposition of cargo, &c. All these subjects are

capable of clear and direct exposition with concrete examples, and without involving the very highest and most difficult treatment. All of them are undeniably necessary knowledge for any naval architect who is to be entrusted with the design of vessels. Yet the South Kensington papers contain no hint of them or a question regarding them. These examinations are not obtaining the sympathies of practical shipbuilders, and unless a change is soon made even their best friends will be unable to support them.

Mr. Denny submitted the following recommendations:—First, that the examinations be extended from three to four stages, so as to cover a period of four years. This period would not be too long, as drawing-office apprenticeships are hardly ever less than of four years' and are generally of five years' duration. He would omit altogether from the examinations, or make optional, questions in wood and composite shipbuilding, and questions in laying off—the former as useless for mercantile yards, and the latter as likely to be well enough taught for the purposes of mercantile shipbuilding in even the most rule-of-thumb shipyards. He would divide the questions for the mercantile yards in each year or stage into two portions, the first to include construction in iron and steel, the strength of rivetted joints, and the nature of iron and steel, their manufacture, and the tests generally required of them. The second portion would include as much of the theory of naval architecture, and the calculations connected with it, as could be imparted during the year's private study to ordinary pupils. The first stage might include, for example, questions on the details of iron construction and its methods, and examination in the calculations necessary to produce an ordinary displacement curve, and to find the vertical centre of buoyancy. The second year might include questions as to the nature of iron and steel, their manufacture and tests, and examination in the calculations necessary to find the longitudinal and transverse metacentres. The third year might include questions as to the strength of rivetted joints and their disposition, and examination in calculations of trim, with concrete examples showing the use of the longitudinal metacentre. The fourth or honours year should include the calculation of the neutral axis and moment of inertia of a scantling

section, and calculations as to stability, showing the use of the transverse metacentre. In the third and fourth years the necessary curves of metacentres, &c., should be supplied for the trim and stability calculations, so as to test the pupils in their ability to utilise these curves. Were such a series of examinations carried out the result would be that the pupils' minds would be awakened to all the main points of importance in naval architecture, and the minds of their teachers would be equally stimulated.

Mr. Denny went on to explain that he did not think that the scheme would be too advanced for the pupils who would present themselves; and as to the ability of the pupils, the experience of his firm justified some confidence being placed in this. Nearly three years ago his firm established a staff of girls as apprentices in their drawing-office, under the charge and instruction of a superintendent lady. At first it was intended these girls should be simply trained as tracers, but they displayed such aptitude that to tracing was added the inking-in of finished drawings, and the reduction of drawings from a greater to a less scale. They are now employed regularly in calculating check displacements; centres of buoyancy, longitudinal and vertical; and metacentres, both longitudinal and vertical. These they do successfully and well. If such work can be overtaken by young girls in less than three years from entering a drawing-office, it is not too much to expect that young men with good education, and a future before them depending upon their own acquirements, should do even better.

In the discussion, Mr. Bascomb defended the South Kensington examinations, for which he prepared the papers for the Department, but under directions and restrictions. The very elementary character of the instruction and examinations, he said, was necessary to suit the class examined—youths and men usually uneducated. He had had to cancel some papers, not because they were technically insufficient—some were excellent in this respect—but because the orthography was bad or indifferent. Thus a shipbuilder's powers must be judged by his capacity to spell *ipecacuana*. Mr. Bascomb thought it "was one thing to produce girls who could trace and make metacentric and buoyant calculations in an office, but it was another thing to produce

men to go into the shipyard and do practical work." Mr. Martell spoke of the pressing necessity for a higher class of teaching and examination, to be held at the great shipbuilding centres, and also of the importance of giving precedence to iron and steel shipbuilding over wood and composite work. Mr. John sympathised with Mr. Bascomb, whose hands were tied by the Kensington Council; but he also sympathised with Mr. Denny, for he understood the necessity for a higher education, and more thorough and practical examination. We have, he pointed out, this South Kensington examination and teaching system and the Naval College, and yet the £50 scholarships lay idle for want of a thorough system of education which the numerous apprentices in shipbuilding work can attend and appreciate, as giving the instruction that is required. It was quite easy to see that a thorough contempt for the South Kensington system was only thinly veiled by the transparent praise bestowed on Mr. Bascomb's work. Mr. White spoke of the perfect accuracy with which the calculations were made by the girls at Dumbarton, and also of the great interest which Messrs. Denny took in those employed by them. He also said that the success of the young naval architects of Dumbarton was not only due to Mr. Denny's firm, but to the practical as well as theoretical knowledge and ability of their chief draughtsman, who is the teacher there under South Kensington, hampered though he is by useless instructions and restrictions. Dr. Woolley said that the paper and the discussion pointed to the necessity of recognising the fact that modern ships, shipping, and ship construction had entirely changed the character of the education necessary for naval architects and draughtsmen, that the South Kensington system of teaching and matter taught were old and totally unsuited to the times, and that the necessary subjects must be determined by those who know something about ships and shipbuilding. Admiral De Horsey expressed his opinion that a knowledge of iron and steel shipbuilding was probably necessary, but he thought wood and composite shipbuilding was not out of date, and that it was of great importance that young men should be instructed in building wood ships, for if they were not so much built here now as formerly,

young men would be glad to learn to build such ships to enable them to go to America and Canada and there make use of their information. Mr. Denny, in reply, thought there was something curious in the excuse for instruction in wood shipbuilding, that it was necessary to young men to take to America and Canada, and he asked Admiral de Horsey what ships he thought the young men were going to build out there. In the continuation of his reply, Mr. Denny urged the necessity for some such system of education as he had proposed.

A paper was then read

ON STRENGTH OF CRANK SHAFTS.

By Mr. J. T. MILTON.

In 1879 Mr. Milton read a paper "On Some of the Causes of the Failure of Crank Shafts," in which he showed that the bending moment constituted a considerable portion of the whole strain on crank shafts, and that when bearings get out of line the bending moment may be much greater than the twisting moment. He gave curves showing that in an engine with cranks at 90 deg., and with the second bearing slack, the strain on the shaft was increased to 1.57 times its original amount, while with the first bearing slacked, the strain was increased 2.29 times. In another engine with cranks also at 90 deg., the increase of strain was 1.60 and 2.24 times respectively. In the paper read on the 7th inst., he described the effect produced on the strains on the shafting by variations in the angles between the cranks, and also by variation in the length of the stroke. For this purpose he took the indicator diagrams of a pair of engines with cylinders of 30 in. and 60 in. diameter and 39 in. stroke, worked at a boiler pressure of 85 lb. per square inch. From the diagrams the crank pin pressures were ascertained, allowance being made for the effect of inertia and weight of the reciprocating parts. The strains on the shafting were calculated for every 20 deg. of the revolutions of the engines in ten cases, the angles between the cranks varying from 90 deg. to 180 deg. The similar strains occurring in the engine on the supposition of the stroke being increased to 60 in. were also calculated. The twisting moment is increased proportionately

to the length of stroke, but the bending moment remains unaltered. In each case the author calculated the amount of the increased strain due to slacking back the bearing as well as the strains caused by the ordinary working. By diagrams it was shown that the least twisting strain occurs when the angles of the crank are at 90 deg.; gradually increasing with the increase of the angle between the cranks until at 180 deg. it reaches its maximum of 35 per cent. in excess of that at 90 deg. The ratio of the maximum moment to the mean, viz., 1.31 to 1 in one engine, even with the cranks at 90 deg., is greater than it is usually thought to be, but the author remarked that in a large number of cases, when the inertia and the obliquity of the connecting rod are taken into account, he rarely found the ratio to fall below 1.25 to 1. The paper was accompanied by a number of diagrams showing the relative strains on crank and screw shafts, with the cranks at different angular positions, and the bearings in and out of line. From these diagrams it appeared that the extra strain thrown on the crank shaft by increasing the angle of the cranks beyond 90 deg. is not so great proportionately as that thrown on the screw shafting, whilst the extra strain thrown upon the crank shaft by bearings not in line is less in the engines with the cranks wide apart than in that with the cranks at 90 deg. These diagrams also showed that in engines in which the strokes bear different proportions to the diameters of the cylinders, it is wrong to assume that the straining effect on the shafts varies as the twisting moment, it being seen in the two cases, that with the same useful work done in the engine with the longer stroke, the crank shaft is only strained about nine-tenths as much as in the short stroke engine, while in the extreme cases of the shaft being unevenly supported at the bearings, this proportion becomes still less.

Mr. Milton's paper was followed by one

ON THE INFLUENCE OF THE CUT-OFF AND LENGTH OF STROKE ON THE
WORKING OF STEAM ENGINES.

By Mr. C. STROMEYER.

Taking a number of theoretical diagrams, the author of this paper calculates the loss due to guide friction and crank pins, and

gives tables of constants representing the mean normal pressure on guide bars and mean pressure on crank pins for single, double, and treble engines, with different lengths of stroke, different ratio of connecting rod to stroke, and with cut-off varying from 0.10 to 0.90 of the stroke. From a full discussion of the elements involved in these points he derives approximate formulæ for guide and crank pin friction and for the loss due to friction. From these, by aid of the tables of ratios and mean pressures and certain coefficients, simple rules for practical application are deduced. He takes into consideration the momentum of the oscillating masses, and gives rules and constants for finding the inertia in foot-pounds of the revolving masses of an engine necessary to prevent the speed from varying beyond certain limits of average speed, and to find the weight of a fly-wheel which will secure the same degree of uniformity. This paper it would be impossible to condense into a short abstract and at the same time give the tables and formulæ deduced by the author. There was no discussion upon the paper.

THE NEW TAY BRIDGE AND NAVIGABLE RIGHTS.



SELECT Committee of the House of Commons has passed with some modifications the Bill promoted by the North British Railway for building a new viaduct over the Tay, near Dundee. The Bill, which proposes to build the bridge with a headway of 77 feet at high water, was resisted by the merchants and traders of Perth and Newburgh, and some public interest attaches to their opposition. Perth and Newburgh are about 20 miles above Dundee, and both ports have a considerable amount of traffic in foreign and coasting vessels, which, if not rapidly increasing, appears to show no signs of diminution. It was contended on behalf of these ports that however advantageous to Dundee the bridge as designed might be, Parliament would not be justified on that account merely in confiscating the public rights of the upper ports in the navigation of the river. Unfortunately the

case was to a great extent prejudiced by the fact that a Select Committee last year approved of all the main points of the Bill, and only refused to pass the preamble from want of confidence in the plans then submitted. Moreover the public bodies who originally petitioned against the Bill, came to terms with the promoters, receiving money compensation for the alleged injurious effect on their interests by the erection of the bridge. The private merchants whose interests are, of course, more extensively affected by the obstruction than those of the Corporation, and who, it appears, do not share in the distribution of the compensation money, were left the only opponents of the Bill. Statistics were laid before the Committee showing the mastage of vessels going to Perth and Newburgh, with the view of proving that the larger class of ships would be either greatly inconvenienced in passing the bridge, or deterred altogether from making the attempt. Evidence was also given by owners of the smaller craft that ply upon the river, that on account of the direction of the tidal currents which flow diagonally under the bridge, their trade would be seriously damaged. Select Committees do not usually give the reasons for their decision, but it may be inferred that the Committee on the Tay Bridge was not convinced that the obstruction to navigation was so great as to justify it in reversing the decision of the Committee of last year. The result was to involve a real hardship, for a certain amount of obstruction must necessarily take place, as is indeed admitted by the compensation offered to the Corporation, while the private traders who suffer first and most thereby are necessarily left without redress. The Committee gave them a small modicum of compensation by a clause requiring the railway company to tow all vessels to or from Perth or Newburgh one mile below and one mile above the Bridge. On public grounds it is also to be regretted that a water-way, which ought, under altered but imaginable circumstances, be of vast importance to the great agricultural county of Perth, should be partially closed and its future development completely prevented. Railway enterprise is every day becoming more centralised and also more aggressive, and there never was a time when we could less easily dispense

with even the smallest inlet for competition by water. In the present case the lowering of the height is meant to conciliate public opinion, not unnaturally alarmed by the fate of the old bridge, but it was frankly admitted by the engineers, that the question of height had nothing to do with safety, and that a bridge of any height might safely be built on the proposed site. To that extent, the obstruction of the river is an unnecessary interference with its navigable character. When the question is between an increased expenditure of money by a railway company pushing its own trade as best it may, and the partial destruction of a navigable channel, however insignificant its present commercial interests may be, there seems to be very little room for doubt what the decision ought to be. Very possibly the question may arise again next year, as the railway company are really in favour of a much lower bridge, and were only prevented by the Standing Orders from proposing one this year. In that case, it is to be hoped that the interests of the navigation will be strenuously defended.

OUTRAGES ON ENGLISH FISHERMEN IN THE NORTH SEA.

R. W. H. HIGGIN, Q.C., has presented a report to the House of Commons on the subject of the alleged outrages in the North Sea committed by foreign on English fishermen, and the conclusions at which he arrives are briefly summed up as follows:—

1. That grievous injury and damage have been done to the drift nets and tackle of English fishermen in the North Sea by trawlers belonging to France, Belgium, and Holland.
2. That there is no international law or convention between England and France, England and Belgium, or England and Holland affecting the fisheries in the North Sea.
3. That such a convention as was by the Act of 1868 intended to be operative between England and France forms an admirable basis for international law or convention between the four above-mentioned nationalities.

4. That until some such international law is passed and enforced it is impossible but that such outrages as it has been my duty to inquire into will be committed and cannot be stopped.

5. That some international law with reference to the fisheries in the North Sea is urgently required.

6. That such law ought to be enforced by the presence upon the fishing grounds of cruisers belonging to each of the four nationalities.

7. That means ought to be adopted whereby the trade carried on by the "coopers" or "bumboats" may be swept off the face of the North Sea as a public nuisance.

8. That all fishing boats, of whatever nationality, should be marked with letters and figures on the bows and in the mainsails, of such dimensions as to be plainly visible at moderate distances.

Mr. Higgin took evidence at Lowestoft, Yarmouth, Grimsby, Hull, Scarborough, Berwick, and Blyth; and in his report he says that the East Coast Fisheries are very important industries, employing large numbers of men and boys for nearly the whole of the year; while the capital embarked in the trade is very large, the boats are of considerable tonnage and very numerous, and the nets and tackle are of great value.

The English drift net fishermen make the following complaints:—

"1. That foreign trawlers during the night, when the drift nets are shot, make a common practice of deliberately and wantonly trawling into and through the drift nets, to the great damage and loss of the owners. 2. That the foreign trawlers in many cases make use of an instrument called the 'devil' for the purpose of cutting through the drift nets, thus allowing the trawler to sail through them without the necessity and labour of hauling up his trawl. 3. That when their nets are so cut adrift they are frequently afterwards found in Belgian and Dutch ports, and that they have to pay very exorbitant charges in order to recover them, in addition to their expenses incurred in going to and searching them out at the foreign ports, and that in many cases the cost of recovering their nets exceeds their value. 4. Another subject of complaint relates to the infamous trade carried on by 'coopers' or

'bum-boats.' These vessels may shortly be described as floating grog shops of the worst possible description, uncontrolled and unregulated by any superior power or force whatsoever. The revelations which have been made, and which are spoken to by many of the witnesses, all show the nefarious nature of the trade carried on by these 'bum boats,' and the dreadful evils therefrom resulting, evils which not only include theft, gross breaches of trust, assaults, violence, robbery, obscenity, and smuggling, but even in not a few cases resulting in violent deaths. 5. That as between England, France, Belgium, and Holland there is no international law with reference to the fisheries carried on in the North Sea."

"The fishing voyage extends to about six weeks—that is to say, the drift net boats remain at sea during that time, and send their catches of fish into port by fast sailing boats attached to the fleet, called 'cutters.' An account is kept of the earnings of the boats, and at the end of the voyage the expenses are deducted from the earnings, and the balance divided into shares between the owner, the master, and the crew. The shares are such as are agreed upon in each case, and they vary in amount, but both master, crew, and boys, as well as the owner, are gainers or losers according as the expenses of the voyage are increased or reduced; in other words, when nets are destroyed from any cause whatever the loss does not fall alone upon the owner, but it is shared by the master, the crew, and even the boys."

A POINT OF LAW IN THE CATTLE TRADE.

IN the case *Wright v. Marwood—Gordon v. Marwood*, a decision of considerable importance to shipowners and shippers of cattle, was delivered by the Lords Justices in the Court of Appeal at Westminster on the 16th May. The suit arose with respect to the shipowner's liability for cattle carried on deck and jettisoned for the safety of the ship. In the case in point, the vessel shipped 53 oxen from New York for

Portsmouth, at £4 15s. per head, the shipowner not being liable for mortality or injury. In the course of the voyage bad weather was encountered, and the master deemed it necessary to throw the animals overboard to ensure the safety of the ship. The vessel completed her voyage and proceeded to Antwerp, where the owners of the oxen instituted proceedings against the shipowner on the ground that the cattle had been jettisoned without sufficient reason, but the Court decided against them. They then commenced a suit in this country for the purpose of recovering the value of their cattle, and Lord Justice Brett, before whom the case was heard at Liverpool, gave judgment in their favour. A divisional Court of the Queen's Bench subsequently confirmed this decision.

An appeal from these judgments was made, and the case was argued on the 15th March, the counsel for the defendants setting up the plea that the practice of carrying cattle on deck is dangerous to the navigation of the ship, and is therefore contrary to law. The Lords Justices took this view of the case, and reversed the decisions already given. In delivering the judgment of the Court of Appeal, Lord Justice Bramwell stated that the law of this country, as well as that of other civilised nations, holds the practice of carrying cattle on deck to be illegal. The suit brought by the owners of the cattle against the owners of the ship could not, therefore, be maintained.

SOUTH AUSTRALIA.

REPORT OF PRESIDENT OF THE MARINE BOARD.

FROM this report for the year 1880, we give an abstract of so much of it as is important and interesting to shippers and masters.

Port Victor.—The breakwater is carried out for about 500 ft., and the depth of water is rapidly increasing, of course necessitating a very much larger amount of material for its construction. I should imagine there will be at least twice the quantity of stone required for the last 500 ft. The portion

Already completed has considerably lessened the range alongside the old jetty, consequently the facilities for loading and discharging have been greatly increased.

Kingston.—The work of fender-piling the Kingston Jetty is being carried out, and screw moorings are being placed in position for enabling vessels to haul to and from, and to assist in taking the strain off the jetty when northerly and north-westerly winds prevail. Immediately it is constructed the old one should be removed, for as long as it remains vessels will use it, and in the event of a sudden gale arising from the south-west causing them to break adrift great damage to the new structure will ensue.

Six sets of screw moorings, with hauling-off buoys attached, are now being placed in position along side of the new jetty at Kingston. They are not intended for vessels to ride by, but are merely for assisting them to and from the jetty, or for hauling off slightly when N. or N.W. winds prevail.

Eclipse Rock.—A screw-pile basket beacon has been erected on the Eclipse Rock, off Port Victoria.

Under the head of Lighthouses, we find the following observations:—

Plank Point.—During the year thirty-six masters and owners of vessels were invited, by circular, to offer an opinion as to the most desirable site for a lighthouse between Tipara and Lowly Point, and the result was as follows:—In favour of Plank Point, 21; Middle Bank, 8; Shoalwater Point, 4; and other places, 3. My own opinion is, and always has been, in favour of Plank Point, and I therefore strongly recommend that provision be made on the estimates for 1881-2 for this new lighthouse, because the safe navigation of our waters, and the increasing traffic in Spencer Gulf, demand such consideration.

Eastern Shoal.—If a light be placed on Plank Point, the lightship now stationed off the Eastern Shoal could be removed to the north end of the shoal, and so lie in smooth water. At times the rolling and pitching of the lightship is intolerable, making the abode anything but pleasant for the unfortunate keepers who happen to be stationed there for at least eleven months out of the twelve.

Neptune Island.—For years past I have drawn attention to the necessity for a light of the first order on the South Neptune Island. During the last passage of the Orient steamer *Chimborazo*, whilst running for Investigator Straits, in thick dirty weather, the Althorpe Island light was sighted before Cape Borda, necessitating a course being shaped to the Cape for the purpose of reporting, which, I understand, masters of the Orient liners have orders to do. Now, if a first-class light had been placed on Neptune Island, a course could at once have been shaped for Cape Borda, and thus two or three valuable hours would have been saved. Apart from this, during flood tides there is a strong set into Spencer Gulf, carrying ships to the northward. I know an instance where a mail steamer from King George's Sound, bound to Adelaide, passed between the North and South Neptune Islands during the night, and the first intimation the master had of his position was by observing that the ship was between two islands. It so happened that no observations were obtained during the entire passage, and that a considerable set to the northward existed. From a glance at the chart he, of course, immediately realised his position, and was enabled to proceed without any loss of time. Another reason why a light should be placed on this island is, that all ships from England bound to Spencer Gulf would make this light as a landfall; and in the case of those bound to England, India, or the Cape, it would be taken as a point of departure, and would save many a master hours of anxiety and worry. In these days of rapid steam communication all possible means should be adopted, both to prevent accidents and to simplify navigation.

Marine Board Acts.—Early steps should be taken by the Government to remedy the numerous defects in our present laws. Most glaring cases of shipwreck and disaster have occurred without the infliction of the punishment deserved. The necessity for a complete amendment of nearly every part of the law is so apparent and has been so frequently referred to by myself and others, that I can now do no more than express the hope that a comprehensive measure will be placed before Parliament immediately the House meets.

Examinations were held and certificates of competency granted to

masters, twelve mates, one first-class engineer, two second-engineers, ten engineers for River Murray steamers, and six engineers for steam launches. Certificates of survey issued to 129 steamships of various descriptions, and twenty-five were swung for adjustment of compasses.

—Thirty-two certificates of exemption from pilotage at ports of the colony have been issued to masters of ships.

Some doubts were expressed as to the sufficiency of the law relating to compulsory pilotage at outports, the Board, on 1 June, made a bye-law declaring that pilotage was compulsory at Ports MacDonnell, Beachport (Rivoli Bay), Victor, Pirie, and Augusta. This was done, not that the Board altered their views with respect to pilotage, but because it appeared necessary to carry out what is said to be the law on the subject. The Board are still of opinion that compulsory pilotage should be abolished, an opinion which was reported as follows:—"We are of opinion that the present compulsory pilotage is not conducive to the security of property at sea, and from the evidence we have taken, we would be, upon the whole, advantageous to get rid of it. We do not consider that it falls within the scope of our Commission to go beyond this statement, or to discuss its bearing upon private or corporate interests and privileges. But we think that the present systems which tend to remove responsibility from masters and their paid servants are against the true principles of maritime policy, and we consider that compulsory pilotage is one of the worst of these systems."

Several vessels which were procured by the pilots for the purpose of towing down the Gulf of St. Vincent, not having the success anticipated, have been withdrawn, and the old schooner boarding off the Semaphore, Port Adelaide, has been ordered.

Casualties.—The total number of wrecks for the year 1882, viz.—the ship *Lady Kinnaird*, near Cape Burr, Gulf, and the ketch *Prima Donna*, which left MacDonnell Bay for Port Adelaide, and is supposed to have foundered

at sea. The only serious stranding was that of the Orient liner *Sorata*; and, although she was ashore for about ten weeks, she was ultimately floated off and taken to Melbourne for repairs.

Port Pirie.—The inner bar, or Narrows, has been deepened to a depth of 10 ft. at low water springs; and the channel of the Narrows has been straightened, thus rendering the navigation easier than heretofore. At present the dredger is cutting a channel through the outer bar to give a depth of ten (10) feet at low water springs. In three or four month's time the work will be completed, and a channel 800 ft. wide, with 10 ft. at low water springs, will be provided. Immediately the outer bar is finished, it is proposed to widen the Narrows to 300 ft., and vessels will then be enabled to pass each other in safety. When this widening has been accomplished a good channel will exist from seaward to Port Pirie, having a depth of not less than 10 ft. at low water, and the question then arises as to whether it is advisable to deepen any more. A return called for by the Legislative Council shows that to give a depth of 20 ft. at low water in a channel 800 ft. wide, from seaward to Port Pirie, a distance of about six and a-half nautical miles will have to be deepened, at a cost, including discharging on shore, of about £387,870.

Webb Rock.—A tender has been accepted for the removal of Webb Rock, Spencer Gulf. Under the contract, the rock (which is awash) is not to have less than 30 ft. over it at low water.

Survey of Spencer Gulf.—Representations having been made by several shipmasters with reference to the existence of a shoal spot in the upper part of Spencer Gulf, I proceeded in the *Governor Musgrave* and placed a buoy on the shoalest part, in four and a-half fathoms at low water. It has been suggested that this shoal might have been formed by ships discharging ballast there, but this is not the case, because the patch extends for about a mile in length, and half-a-mile in breadth. The soundings increase from four and a-half to five and a-half fathoms at its extremity, and then gradually deepen. The Admiralty charts gives nine fathoms on the spot. This fact shows the absolute necessity for sounding out the upper part of the gulf from Lowly Point to the Middle Bank, where I am informed that there is three or four feet less water than

is shown on the chart. I regret that the survey officers were allowed to leave the colony without attending to this important work, because the increasing trade of Spencer Gulf demands it; but I understand that an unemployed survey officer, now resident in Sydney, is open to engagement, and, with the concurrence of the Admiralty, I have no doubt would satisfactorily carry out the work. There are several gentlemen here quite competent to perform the duties, but the Hydrographic Department of the Admiralty very properly objected to publish the result of surveys which have not been undertaken by their own officers. The surveying schooner *Beatrice*, which was the joint property of the Admiralty and the South Australian Government, now belongs to the latter, and I trust will soon be put in commission for this work.

Graving Dock.—The Government should have a dock capable of taking in the largest vessel that comes to the colony, and I cannot too strongly urge the necessity for such a public work, which, in my opinion, need not cost more than £25,000. The expense of slipping the Government vessels, dredgers, and hoppers, &c., amounts to a considerable sum every year. If such a dock had been provided there would have been no necessity for sending the *Sorata* to Melbourne, where many thousand pounds have doubtless been spent in connection with her repairs. I feel sure that many of the iron fleet trading to our waters would also take advantage of the dock before loading up for Europe, provided the charges were moderate, because the vessels would thereby be enabled to make quicker passages. Fifty days, at least, might be deducted from the long passages frequently made.

Gas Beacons, Port Adelaide River.—The expense of burning gas in these beacons was so great, and as on several occasions the lights were blown out, and the pipes leading across the sands were frequently washed out of place by the tides and filled with water, I considered it advisable to use mineral oil as an illuminant. I am glad to state that this has given general satisfaction, for not a single complaint has been heard since the change was made.

Shipping.—The arrivals at the various ports in the colony were 1,045 ships, of 580,085 tons, and carrying 27,432 men. This shows a falling off of 47 in the number of vessels as compared with

1879, but the number of men is greater by 4,408, and the by 112,356, than in that year. There is a large increase in the number of ships, men, and tonnage from Great Britain from foreign states, also of men and tonnage from possessions, but the number of ships from the latter is great as in 1879 by 85.

The shipping *outwards* amounted to 1,111 ships of 610,8 carrying 28,402 men, or 72 ships, 6,253 men, and tons more than in the previous year. A remarkable increase in the shipping cleared for Great Britain will be observed, the of vessels (213) being more than in the two previous years together, and the men (6,153) and tonnage (206,709) come up to a similar total. The number of vessels to British possessions has fallen off, but the number of men and tonnage have considerably increased. The shipping to foreign states, which during two previous years had rapidly grown, has this year decreased ships, men, and tonnage. I think it is a pity there are no published, or, as far as I am aware, even kept, to show the of the *Coasting Trade* of the colony, which on our coast about 2,400 miles, without including that of the Northern Territory is considerable.

There is a marked increase in the size of ships which traded in 1879, 21 ships of 2,000 to 2,500 tons arrived at Adelaide, and 26 in 1880. In the former year, there were 7 ships between 2,500 and 3,000 tons each (the largest of which arrived in that year), and in 1880 there were 1 like tonnage, and 2 upwards of 3,000 tons each. Several ago the largest ship that came to Port Adelaide was not 1,500 tons register.

In 1880, the number of vessels (exclusive of all coasting except steamers) which came into the harbour of Port Adelaide was 891 which is less than in the previous year by this number, 641 came into the Port on the day of arrival, 1 day after, and 79 from two to twelve days after there is no doubt that most of these were detained for or other reasons rather than for want of sufficient water on the

The shipping owned in the colony increases slowly but re

On the 31st December last, 212 sailing ships and 75 steamships were on the register, and their combined tonnage was 32,391 tons, or 10 ships and 1,191 tons in excess of the previous year. Shipbuilding is a trade for which there is not much encouragement in the colony. Six sailing ships and 2 steamships, giving a total tonnage of 222 tons, were built during the year.

R. H. FERGUSON, President Marine Board.

Port Adelaide, February 21st., 1881.

MEASUREMENT OF TONNAGE.



THE following is the text of a Bill brought in by Mr. Chamberlain and Mr. Ashley, in reference to the construction of the provisions of the Merchant Shipping Act, 1854, with respect to the measurement of tonnage:—

Whereas under the Merchant Shipping Act, 1854, and the Acts amending the same, the tonnage of ships is ascertained by measuring the whole space included in a ship and then making certain deductions therefrom:

And whereas it is the intention of the said Acts that nothing shall be included in the deduction which has not first been included in the measurement:

And whereas doubts have risen whether the said intention is properly carried into effect by the language of the said Acts:

And whereas it is expedient to set at rest the said doubts and to secure the carrying into effect of the said intention:

Be it therefore declared and enacted by the Queen's most excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

1. This Act may be cited as the Merchant Shipping (Tonnage) Act, 1881.

2. This Act shall be construed as if it had been incorporated in the Merchant Shipping Act, 1854, and the Acts amending the

same, and the said Acts and this Act may be cited collectively as the Merchant Shipping Acts, 1854 to 1881.

3. The intent of the said Act of 1854, and the Acts amending the same, is that no deduction to be made from the register or gross tonnage of a ship, as the case may be, shall be allowed in respect of anything which has not been added or included upon the ascertainment of such register or gross tonnage, as the case may be; and the said Acts shall be construed and applied accordingly in all future cases.

REGULATIONS FOR PREPARATION AND STOWAGE OF GRAIN-LOADED VESSELS.

ADOPTED BY THE BOARD OF UNDERWRITERS OF NEW ORLEANS.

STEAMSHIPS.

1. All steamers with water-ballast tanks will not be required to sheath over the same, if the flooring is grain tight.

2. All steamers without water-ballast tanks and the floors planked with $2\frac{1}{2}$ or 3-inch plank, the same being sound, dry and grain tight and not less than 18 inches above cementing, will not be required to sheath over the same.

3. All steamers having one continuous hold forward, shall put up one cross bulkhead in the same, and aft if deemed necessary by the surveyor.

4. Shifting-boards from deck to keelson of $2\frac{1}{2}$ -inch plank edge and edge or 1-inch boards each side of stanchions, edge and edge and seams doubled.

5. No bulk grain to be carried in between decks or (where a ship has more than two decks) between the two upper decks—unless in properly constructed feeders to feed the hold.

6. All steamers not having properly constructed feeders, will be allowed to run bulk until the grain is within 4, 5 or 6 feet of lower deck (according to depth of hold), bulk grain then closely covered with 1-inch boards and not less than 4, 5 or 6 heights of bags stowed over the bulk to prevent shifting.

7. All steamers having one deck and beams, will be allowed to run grain in the vessel until within 5 or 6 feet of deck, then

platformed over as above and not less than 5 tiers of bags stowed over the bulk to prevent shifting.

8. The draft of water in all cases to be regulated by the surveyor, with a proper allowance for fresh water, and to prevent overloading, care must be taken that too much bulk grain is not run in the vessel to prevent the above-named heights of bags.

The above to be done under the inspection of the surveyors appointed by the Board of Underwriters of this port, with the understanding that the grain clause in time policies is not to be controlled or affected hereby.

SAILING VESSELS.

It is understood that all Lumber used shall be Seasoned Yellow Pine.

1. The sleepers to support the platform on the floor of the vessel, not to be of less than 3 by 4 inches and placed 14 inches apart, and supported by studs 16 inches apart; height above ceiling and bilges to be regulated by the surveyor, according to model of vessel.

2. The floor to be of 1-inch boards doubled, all free from holes or rents.

3. The stanchions for bulkheads to be 4 by 4, 14 inches apart, well secured at top and bottom, with braces on centre, and double boarded with 1-inch boards.

4. The shifting-boards to be same quality and thickness double, and to extend from within 2 feet of keelson on both side stanchions to lower and upper beams, said stanchions to be well secured at top and bottom.

5. The sides of the vessel to be ceiled with 1-inch boards (over not less than 1-inch strips) after the manner of clapboarding reversed, and the edges overlap $1\frac{1}{2}$ inches.

6. All double-deck vessels over 700 tons register, must have one cross-bulkhead near the centre and all vessels to have trimming bulkheads forward and aft from the upper deck down to lower deck or 1 foot below lower beams.

7. The pump-well to be well secured perfectly grain tight and sufficiently large to allow a man to go to the bottom of it and work, and a passage way to it from off the deck, well secured from pressure.

8. Masts and water tanks whether of wood or iron, to be cased.

9. All double-decked vessels will be required to remove plank for the width of 20 inches, the entire length of the vessel, half way between the main hatch and sides, then grain run in until within 5 or 6 feet of upper deck (according to size), the bulk grain then platformed over with 1-inch boards and not less than 5 or 6 heights of sacks stowed over the bulk to prevent shifting.

10. All vessels 500 tons or under, with single deck and beams, will be allowed to run grain in until within 4 feet of deck and not less than 4 heights of bags stowed over it, after being platformed as above.

11. All vessels over 500 tons, with single deck, and beams, will be allowed to run grain in until within 5 feet of deck and not less than 5 heights of bags stowed over it, after being platformed as above.

12. Vessels loading grain in bags, will not be required to comply with the above rules, further than to construct platform on the floor and bilges of the vessel, with the customary precaution of dunnage at the sides of the vessel.

13. The draft of water to be regulated by the surveyor, but vessel must have not less than 3 inches side to each foot depth of hold, between September 1st and March 31st and not less than $2\frac{1}{2}$ inches to each foot as above, between April 1st and September 1st, with $\frac{1}{4}$ -inch to each foot of draft allowance for fresh water.

The same to be done under the inspection of the surveyors appointed by the Board of Underwriters of this port, with the understanding that the grain clause in time policies is not to be controlled or affected hereby.

Approved by New Orleans Board of Underwriters,

GEO. MATHER, Secretary.

THOS. CONWAY,	} Inspectors.
W. M. BAKER,	
E. LEPESE,	
G. SCHNEIDAU,	
J. K. TURLEY,	
S. B. FROST.	

Adopted April 5th, 1881.

CORRESPONDENCE.

COMPULSORY PILOTAGE.

To the Editor of the "Nautical Magazine."

DEAR SIR,—There is much satisfaction in knowing that there is a prospect of the Thames Pilotage question being dealt with, and free pilotage established above Gravesend. But I would like to ask why the pilotage above Gravesend is to be made non-compulsory, and the sea pilotage to remain compulsory; there are absurdities in the regulations for pilotage below as there are for that above Gravesend. For instance, a vessel bound to London with a foreign cargo must employ a pilot, but with an English cargo need not do so, and the same vessel leaving London with a few tons of foreign cargo and bound to the N. E. ports must employ a Swin pilot, whereas if in ballast he is free to go alone; and then again a vessel from the Baltic or North of Europe is free to go without a pilot. Now there may be good reasons with which I am unacquainted why one class of vessels should be exempted and another not; but I cannot at all understand why some ports should have non-compulsory pilotage and others again be compulsory. There is one thing I should like to give my testimony upon, and that is, that at all ports where the pilotage is non-compulsory, there the pilots are always on the alert, and unless it is very bad weather can always be found. But for compulsory ports, there you may look, and wait, and run about after the men who know you must employ them, or pay the same if you do not. I was once bound to Hull, and being off the Newsome float about two hours before high water, I made signals (blue lights and the steam-whistle) for a pilot, and after waiting for half-an-hour, and seeing no response, I started off myself, as I was anxious to save tide into dock. As daylight came on, I hoisted my Jack, and kept it flying till off Grimsby, when we hauled it down, saved my tide into dock, and at 11 a.m. same day received a polite note from the pilot-master to attend at his office as early as possible. Called on him at noon, and was asked to sign the pilot's note, for them to

obtain money never worked for. I very naturally objected; told him I had made all necessary signals but had seen no pilots, and knowing the river as well as a pilot, and not wanting to lose a whole day, I had come on alone; but it appears they had been watching me with a good glass from Hull. Had seen me haul my Jack down off Grimsby, and for that reason claimed pilotage, and politely told me if I would not sign their note, I should be summoned and have to pay double pilotage. So much for compulsory pilotage. But before I close this already long letter, let me give my humble opinion, that if free pilotage is adopted at all our ports, it will make no difference in the number of men employed as pilots, only it would cause them to look sharper after vessels than they do now.

I am, Sir, yours, &c., A. F.

TRUE AND MAGNETIC COMPASS ON CHARTS.

To the Editor of the "Nautical Magazine."

SIR,—If your correspondent "W. E. H.," in the May number of the *Nautical Magazine*, will procure and use one of "Field's Parallel Rulers," he will be independent of true or magnetic compasses on any chart.

By using the above-named rulers, he can find the required true or magnetic course either in points or degrees, and in a similar manner cross-bearings may be laid off without trouble, and on a large scale chart with less risk of error than by using the compass engraved on the chart, which, however, is useful as a check.

The writer (in common no doubt with many others), has used Field's rulers for several years, and therefore knows how to appreciate their worth.

I am glad to hear any of my brother commanders testify to the excellence of the Admiralty charts, which, however, like good wine, need no bush.

Whilst on the subject of Admiralty publications, I should like to ask when are we to have a "Baltic Pilot" of a later date than 1854 for the guidance of the hundreds of steamers which visit the Baltic during the season?

In conclusion, I should add that the chart of equal curves of variation is a useful, and I may say, even an indispensable adjunct to the use of the parallel rulers described above.

I am, your obedient servant,

May 9th, 1881.

T. F. T.

SUEZ CANAL.—In the course of 1880, 2,017 ships passed through the Canal with a tonnage, according to official reckoning, of 2,860,448, but really amounting to 4,878,964. The number of hands employed in the navigation was 128,458; the number of passengers, 53,517. Of the 2,860,448 tons official reckoning, 2,247,306 were British, 177,771 French, 75,820 Austrian, 124,088 Dutch, 71,089 Italian, 56,245 Spanish, 38,162 German, 29,607 Russian, 7,203 Turkish, and 8,032 Egyptian, while 25,180 tons belonged to other States.

MAURITIUS.—In spite of a short sugar crop with the "usual result" of an increase of crime, and also an outbreak of cattle plague that swept off the greater number of the horned cattle, the island of Mauritius, which M. Thiers called "the Malta of the Indian Ocean," is stated by the new Governor, Sir George Bowen, to be in a prosperous condition. Though not larger than an average English county, it has an annual revenue exceeding £700,000, equal to the entire revenue of England in the days of Charles II., and an annual trade estimated at six millions sterling, or equal to the trade of all England in the reign of Queen Anne. The report assures us that the new "Labour Code" gives satisfaction both to the planters and the Indian coolies now forming the peasantry of the island. A noteworthy distinction is the fact that this little possession pays towards its garrison a contribution of £70 for every artilleryman and engineer, and £40 for every soldier of the line.

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

ring the Tidal Constant of the place, according to its sign (+ add, the time of high water on the given day at the port of reference, you me of high water at the place sought.

CE.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
	H. M.			H. M.	
.....	-1 17	Leith	Jersey (St. Helier)	+2 38	Brest
.....	-3 52	Liverpool	Kinsale	-0 18	Queenstown
.....	+2 59	Brest	Lerwick (Shetland) ..	-3 47	Leith
.....	+5 18	Dover	Limerick	+1 15	Queenstown
.....	-0 42	Leith	Lisbon bar	+1 17	Brest
.....	+0 50	Brest	Littlehampton	+0 24	Dover
.....	-2 25	Kingstown	Littlehampton	-0 36	Weston-s.-Mare
.....	-0 18	Greenock	Lowestoft	-4 1	London
.....	-1 49	Leith	Lynn & Boston Deep ..	-0 29	Hull
our	-1 14	Queenstown	Margate	-2 18	London
ridge	-0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
.....	-0 2	Brest	Milford Haven entr. ..	-0 58	Weston-s.-Mare
& Rye bay	+0 8	Dover	Montrose	-0 52	Leith
.....	-0 51	Liverpool	Morlaix	+1 6	Brest
.....	+3 42	Londonderry	Needles point	-1 26	Dover
.....	-1 5	N. Shields	Newcastle	+0 23	N. Shields
.....	-0 8	N. Shields	Newhaven	+0 39	Dover
.....	+3 8	Brest	Newport	+0 16	Weston-s.-Mare
.....	+0 13	Dover	Nieuport	+1 6	Dover
.....	+0 23	Devonport	Nore	-2 28	London
ig Road	+0 19	Weston-s.-Mare	Orfordness	-2 43	London
.....	-2 2	Brest	Oporto	-1 17	Brest
.....	-1 56	Liverpool	Ostende	+1 13	Dover
.....	+0 37	Dover	Padstow	-1 41	Weston-s.-Mare
.....	-0 23	Greenock	Peel, Isle of Man	-0 15	Liverpool
.....	+0 2	Weston-s.-Mare	Pembroke Dock	-0 43	Weston-s.-Mare
.....	-4 22	Liverpool	Penzance	-1 13	Devonport
bar	-0 10	Kingstown	Peterhead	-1 43	Leith
.....	-0 47	London	Piel harbour, Barrow ..	-0 18	Liverpool
.....	+4 2	Brest	Plymouth breakwater ..	-0 6	Devonport
.....	-1 37	Londonderry	Poole	-2 2	Dover
.....	-0 23	N. Shields	Port Carlisle	+0 47	Liverpool
ower	-0 10	Brest	Portland breakwater ..	+1 18	Devonport
.....	-0 27	Dover	Port Patrick	-0 58	Greenock
.....	+4 41	Greenock	Portsmouth	+0 29	Dover
.....	-2 21	Leith	Ramsgate	-2 19	London
.....	+0 33	Devonport	Rotterdam	+4 33	Dover
is	+0 8	Dover	Santander	-0 17	Brest
.....	+7 19	Brest	Scarborough	+0 48	N. Shields
.....	+0 3	Kingstown	Selsea bill	+0 33	Dover
our	+0 17	Queenstown	Sheerness	-1 21	London
amsay	-0 11	Liverpool	Shoreham	+0 22	Dover
.....	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
.....	-0 16	Kingstown	Southampton	-0 42	Dover
.....	-0 27	Dover	Spurn point	-1 3	Hull
.....	+0 56	Dover	St. Ives	-2 10	Weston-s.-Mare
.....	+0 38	Devonport	St. Malo	+2 18	Brest
.....	-0 46	Devonport	St. Mary (Scilly)	-1 16	Devonport
.....	+6 57	Brest	St. Nazaire	-0 7	Brest
.....	-0 47	Brest	Stornoway	+6 38	Greenock
head	-1 59	Hull	Stromness (Orkneys) ..	-5 17	Leith
.....	-0 12	Liverpool	Sunderland	-0 1	N. Shields
.....	-0 5	Dover	Swansea bay	-0 53	Weston-s.-Mare
.....	-0 29	Devonport	Tay bar	-0 11	Leith
.....	+1 42	Dover	Tees bar	+0 22	N. Shields
.....	-0 26	Queenstown	Tenby	-1 12	Weston-s.-Mare
.....	-1 27	Brest	Thurso	-5 49	Leith
.....	+0 10	Greenock	Torbay	+0 17	Devonport
.....	+2 51	Weston-s.-Mare	Tralce bay	-0 58	Queenstown
.....	+2 26	Brest	Ushant (Ouessant)	-0 15	Brest
.....	-0 48	London	Valentia harbour	-1 19	Queenstown
eat)	-0 53	Hull	Waterford	+0 19	Queenstown
.....	+2 50	Brest	Westport	-0 4	Queenstown
.....	+0 5	N. Shields	Wexford	+2 20	Queenstown
.....	-1 52	London	Whitby	+0 22	N. Shields
.....	+6 4	Brest	Whitehaven	-0 9	Liverpool
.....	+0 21	Dover	Wick	-2 55	Leith
.....	-1 12	Liverpool	Wicklow	-0 41	Kingstown
harbour	-0 53	N. Shields	Workington	-0 19	Liverpool
.....	+3 42	Brest	Yarmouth road	-4 43	London
.....	-1 59	Leith	Youghall	+0 13	Queenstown

MONTHLY ABSTRACT OF NAUTICAL NOTICES

No.	PLACE.	SUBJECT.
162	ENGLAND—South Coast—Plymouth Sound—Mount Batten Break-water	Alteration in character
163	IRELAND—South-east Coast—Saltee Islands—Coningbeg Light-vessel	Alteration in fog-signal
164	" North Coast—Foyle River—Londonderry—Rosse Bay	New leading lights.
165	NORTH SEA—West Schelde River	Alteration in various lights
166	" Terschelling Bank	Proposed new light-vessel signal.
167	" Ameland Island	New light.
168	" Ems River—Borkum Flat	Light-vessel replaced.
169	" Eider River	Outer and inner light placed.
170	NORWAY—South Coast—Skagerrak—Jomfruland	Temporary discontinuance
171	BALTIC ENTRANCE	All light-vessels replaced.
172	" Kattegat—Anholt	Intended alterations in
173	" Little Belt—Erø Island—Skjoldness	Intended light and fog-signal.
174	BALTIC—Schleswig-Holstein—Kiel Fiord—Friedrichsort	New fog-signal.
175	" Bornholm—Rønne	Alteration in eastern light
176	" Prussia—Colberg	Alteration in colour of light
177	FRANCE—North Coast—Gravelines	New tidal light.
178	" " Mont St. Michel	Alteration in light.
179	SPAIN—North Coast—Cape Hignera	New light.
180	MEDITERRANEAN—Spain—Malaga	Extension of breakwater
181	" " Aguilas	New light on breakwater
182	" Algeria—Toukonsh Bay	New light.
183	" Italy—West Coast—Civita Vecchia	Obstruction at south end
184	" Archipelago—Greece—Oreos Channel and Gulf of Styrida	Torpedo ground—ships pilots.
185	" Suez Canal—Port Said Entrance	Experimental gas buoy.
186	INDIAN OCEAN—Madagascar—East Coast	Discovery of shoals.
187	AFRICA—East Coast—Zanzibar	Proposed lights.
188	INDIA—Malabar Coast—Tillicherry	Light shown from tower staff.
189	" Gulf of Manar—Paumben Pass	Range of light reduced.
190	" Bay of Bengal—Cocanada—Godavery	Buoyage altered.
191	CHINA SEA—Cochin China—Annam—Turtle Island	Reported rock.
192	RUSSIAN TARTARY—Peter the Great Bay—Port Vladivostok	New and altered lights.
193	AUSTRALIA—East Coast—Moreton Bay—Brisbane River	New and altered lights.
194	SOUTH PACIFIC—Ellice Islands	Reported coral bank.
195	UNITED STATES—Pacific Coast—California—Point Reyes	New fog-signal (steam s
196	SOUTH AMERICA—Brazil—Cape Marca	Reported new light.
197	UNITED STATES—Gulf of Mexico—Louisiana—Trinity Shoal	New light-vessel and fog
198	" Block Island Sound—Cerberus Shoal	New whistling buoy.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

162.—ENGLAND.—*South Coast.—Plymouth Sound.—Mount Batten Breakwater.*—*Alteration in Character of Light.*—The light on Mount Batten breakwater entrance to Catwater and Sutton Pool, is now exhibited from the west end of the breakwater; it is a *white* light, *occulting* at intervals of about *five seconds*, elevated about 24 feet above high water.

163.—IRELAND.—*South-East Coast.—Saltee Islands.—Coningbeg Light-Vessel.*—*Alteration in Fog-Signal.*—Henceforth the signal is *one blast* from the siren of *two and a-half seconds* duration repeated after an interval of *twenty-five seconds*, and followed by *ninety seconds* of silence.

164.—IRELAND.—*North Coast.—Foyle River.—Londonderry.*—*Leading Lights for Channel in Rosse Bay.*—The light (fixed white) previously shown near the graving dock at Rock mill, on the north-west shore below Londonderry, has been moved north-eastward about 150 yards, and is now the western of two leading lights; it is an ordinary gas light, elevated 23 feet above high water. The eastern light is *red*, elevated about 8 feet above high water, shown from an ordinary lantern in a small wooden house on Talis wall partly built; it bears E. by S. from the western light distant about 200 yards. These lights in line lead through the channel in Rosse bay. The red light westward of the graving dock at Rock mill is discontinued. *Variation, 23½° W.*

165.—NORTH SEA.—*West Schelde River.*—The following alterations have recently been made :—

(1.) *Alteration in Baarland Light.*—The light no longer shows red in the direction of Hoedekenskerke, but is *red* over Rug van Baarland, between red buoy No. 14 and white buoy No. 11, indicating that Biezelingsche Ham leading lights must not be kept in line, but that the high light should be brought open somewhat to the westward of the low light in order to clear the shoal near white buoy No. 10.

(2.) *Alteration in Rilland Low Leading Light.*—The light is obscured in the direction between white buoys Nos. 25 and 26 (just below Bath), as a cross-mark on the line of Bath leading lights near the bend of the Hook.

(3.) *Alteration in Bath Low Leading Light.*—The light is obscured in the direction between black buoy No. 27, over the north-west end of Ballast plaat, and white buoy No. 28 (just above Bath), indicating that Rilland leading lights must not be kept in line, but that the high light should be brought open somewhat to the westward of the low light in order to clear Ballast plaat.

166.—NORTH SEA.—*Proposed Light-Vessel with Fog-Signal on Terschelling Bank.*—In May or June, 1881, a light-vessel will be placed on Terschelling bank, with Brandaris lighthouse on Terschelling island bearing S.S.E. $\frac{1}{2}$ E., distant 16 miles. The light will be *flashing white*, showing *twelve flashes every minute*, or *one flash every five seconds*, elevated 36 feet above the sea, and visible from a distance of 11 miles. A riding light will also be shown. The light-vessel, built of iron, painted red with broad white streak, and having the words *Terschellinger-bank* in large black letters on her sides, will be moored in $11\frac{1}{2}$ fathoms water. The light apparatus will be on the mainmast; by day a black ball will be carried at the masthead; the vessel will also have a jigger-mast. Position, lat. $53^{\circ} 33' 0''$ N., long. $4^{\circ} 54' 30''$ E. In order to mark this position, two *watch* buoys, painted red with white band, and the letters (black) T. S. No. 1 and 2 on them respectively, will be placed—No. 1 to the north-west, distant 2 cables; No. 2 to the south-west, distant 2 cables from the moorings of the light-vessel.

Note.—When from any cause, the flashing light cannot be exhibited, a fixed white lantern light will be shown from the mast-head, and a white flare every ten minutes from above the gunwale. When the light-vessel is not at her station, the usual lights will not be exhibited, but a fixed red light will be shown at each end of the vessel. By day, a red standard will be hoisted above the black ball at the masthead. Should a vessel be seen standing in danger, a gun will be fired, and repeated if necessary; also, the two signal flags J. D. of the International Code "*You are standing into danger*" will be hoisted and kept flying until answered.

bright rocket immediately after a gun will denote the need of assistance from the shore.

Also, a fog-signal will be established on board the light-vessel:—It will be a siren worked by a caloric engine, which during thick or foggy weather will give a blast of *five seconds* duration *every two minutes*. Should the siren be out of order or not immediately ready, the signal will be a bell, giving, as regularly as possible, *one stroke every five seconds*. Further particulars in due course. Variation, $15\frac{1}{2}^{\circ}$ W.

167.—NORTH SEA.—*Light on Ameland Island*.—To be exhibited from a lighthouse on the western sand hill of Ameland island,—probably during the first half of May, 1881; it will show, *every half-minute, three white flashes in quick succession followed by an eclipse (triple flashing half-minute)*; elevated 187 feet above high water, and visible from a distance of 20 miles. Position, lat. $53^{\circ} 27' 0''$ N., long. $5^{\circ} 37' 35''$ E.

168.—NORTH SEA.—*Ems River*.—*Borkum Flat Light-Vessel* Replaced in Position.—Replaced in position near the watch buoy on Borkum flat (position approximate, lat. $53^{\circ} 49' 0''$ N., long. $6^{\circ} 17' 0''$ E.) Further notice will be given of the exact position of the light-vessel.

169.—NORTH SEA.—*Eider River*.—*Outer and Inner Eider Light-Vessels*.—These light-vessels have been replaced in position; the outer Eider light-vessel is now painted red, instead of black as formerly; and the inner Eider light-vessel is now moored about one cable above her former position.

170.—NORWAY. — *South Coast*.—*The Skagerrak*. — *Intended Temporary Discontinuance of Jomfruland Light*.—From 1st June to 10th July, 1881 (during repairs), the light on Jomfruland will be discontinued.

171.—BALTIC ENTRANCE.—All the Danish and Swedish light-vessels are now at their stations, the ice having disappeared.

172.—BALTIC ENTRANCE.—*The Kattegat*.—*Intended alterations in Anholt Light, Exhibition of Provisional Light*.—During the summer of 1881, it is intended to make the following alterations in the light exhibited on Anholt island; it will show a *white flash every twenty seconds*, elevated 133 feet above the sea, and should

be visible from a distance of 17 miles. The light will probably be exhibited in August, 1881. Pending the alterations, a *provisional* light showing a *white flash every twenty-five seconds*, similar to the present light, will be exhibited. This provisional light (exhibited about the end of May), will be shown from a wooden scaffold erected on the east side of and close to the lighthouse, at such an elevation as to be above the present lantern, and be visible in the same directions as the present light.

173. — BALTIC ENTRANCE. — *Little Belt.* — *Ærø Island.* — *Intended Light and Fog-Signal on Skiold Ness.* — It is intended (probably in October, 1881), to exhibit a light from a lighthouse erected on Skiold Ness (Skjoldnæs), 343 yards from the north-west extreme of Ærø Island: — It will show a *white flash every thirty seconds*, elevated 106 feet above the sea, and should be visible from a distance of 15 miles. Position, lat. $54^{\circ} 58' 10''$ N., long. $10^{\circ} 12' 40''$ E. Also that a [fog-signal will be established near the lighthouse. It will be a siren, which during thick or foggy weather will give *one powerful blast every two minutes*. Further notice will be given in due course.

174. — BALTIC. — *Schleswig-Holstein.* — *Kiel Fiord.* — *Fog-Signal at Friedrichsort Lighthouse.* — The signal is a gong, which during thick or foggy weather will (in answer to the sound-signals made by passing vessels every two minutes in accordance with the regulations), be sounded for *fifteen seconds* with intervals of *forty-five seconds* — that is, in every minute the gong will be sounded *once* for the period of *fifteen seconds*. This signal continued as long as the signals from the passing vessel are heard. *Note.* — As there is no keeper in the lighthouse during the day, about half-an-hour may elapse from the commencement of the fog to the first gong-signal.

175. — BALTIC. — *Bornholm.* — *Alterations in the Eastern Harbour Light at Rønne.* — The light is *fixed red* instead of *fixed green* as previously, and is now elevated 76 feet above the sea.

176. — BALTIC. — *Prussia.* — *Colberg Harbour Light.* — *Alteration in Colour.* — On 1st June, 1881, the following alteration will be made in the colour of the harbour light exhibited on the extremity of the East mole at Colberg (Colbergmünde), in order that it may

be better distinguished from the lights of the neighbouring buildings. It will be a fixed red light, instead of fixed white as at present.

177.—FRANCE.—*North Coast.*—*Tidal Light on Jetty at Gravelines.*—A red light is shown at the end of the north-east jetty during the time there is sufficient water to enter the port.

178.—FRANCE.—*North Coast.*—*Baie de Mont St. Michel.*—*Alterations in Mont St. Michel Light.*—On 1st May, 1881, Mont St. Michel light would be transferred to the watch-tower of Gabriel tower or of Moulin, on the old enclosure of the Mount, Couesnon river entrance. The light (fixed red) will be elevated 41 feet above high water (54 feet above the ground), visible through an arc of 180° ; it will be exhibited as previously, from 2 hours before high water until $1\frac{1}{2}$ hours ebb. The luminous part of the light will only be increased towards Couesnon river entrance, and in this direction it should be seen from a distance of $6\frac{1}{2}$ miles.

179.—SPAIN.—*North Coast.*—*Light on Cape Higuer.*—On 1st May, 1881, a light would be exhibited from the new lighthouse erected on cape Higuer (Higuer), west point of Fuenterrabia bay. It will be a red light, varied by eclipses at unequal intervals of ten and fifty seconds alternately, visible through an arc of 274° or between the bearings of S. 84° E. and N. 10° E.; elevated 190 feet above high water (69 feet above the ground), and should be seen from a distance of 20 miles. The lighthouse consists of a bluish-gray tower standing northward of and in the centre of the keeper's dwelling, a building of the same colour and of one storey; the lower part (49 feet) of the tower is square in shape, the upper part (16 feet) octagonal, surmounted by a cylindrical turret and white lantern. Position, lat. $43^{\circ} 28' 50''$ N., long. $1^{\circ} 47' 50''$ W. Variation, 18° W.

180.—MEDITERRANEAN.—*Spain.*—*Port Malaga.*—*Extension of Breakwater.*—On account of the projected works at port Malaga, the foundation of the east breakwater has been extended from the tongue formed by the old mole and Malagueta beach, in a S. 19° E. direction for a distance of about 186 yards, with a breadth of about 49 yards.

181.—MEDITERRANEAN.—*Spain.*—*Light at Port Aguilas.*—On 1st July, 1881, a light will be exhibited from a mast on the extremity of the breakwater in course of construction at port Aguilas. It will be a red light, visible seaward through an arc of 180° , between the bearings of N. 62° E. and S. 62° W., elevated 28 feet above the sea, and should be seen from a distance of 6 miles.

Note.—As the breakwater is extended, the light will be moved outward. Variation, 17° W.

182.—MEDITERRANEAN.—*Algeria.*—*Light in Toukoush Bay.*—On 15th May, 1881, a light would be exhibited from a lighthouse recently erected on the west side of Toukoush (Takouch) bay. It will be a fixed white light, elevated 135 feet above the sea, and should be seen from a distance of 9 miles. The light will not be visible westward of the bearing S.W. by W. $\frac{1}{4}$ W. The lighthouse, 15 feet high, constructed of masonry and cylindrical in shape, is situated E. by N. of the village of Herbillon, distant about 650 yards. Position, lat. $37^\circ 4' 20''$ N., long. $7^\circ 23' 30''$ E. Variation, $18\frac{1}{4}^\circ$ W.

183.—MEDITERRANEAN.—*Italy.*—*West Coast.*—*Civita Vecchia.*—*Obstruction in Southern Entrance.*—The southern entrance to the port of Civita Vecchia is greatly obstructed by the wreck of the British steam-vessel *Linda*; during a gale in January 1881, the *Linda* parted her stern moorings, swung to her anchors, and was bilged on the rocks at the north-east end of the southern arm of the mole. She is lying with her head to the northward, the masts still standing, sunk from the taffrail to the mainmast, the bow being high out of water, and is a dangerous obstruction to the navigation of the port during the night. The cargo (coal) was being slowly got out by divers, but no attempt had been made to raise the vessel.

184.—MEDITERRANEAN.—*Archipelago.*—*Greece.*—*Torpedo Ground in the Oreos Channel and Gulf of Styliida.*—Torpedoes have been placed for exercise in the Oreos channel and gulf of Styliida, between Oreos and Styliida. Commanders of vessels therefore entering Oreos Channel must take a pilot at Oreos, and on leaving should take one at Styliida; addressing themselves to the Port

authorities at those places in order to engage special pilots for the purpose. Vessels arriving should discharge their pilots at Styliida, those leaving, at Oreos.

185.—MEDITERRANEAN.—*Suez Canal.—Port Saïd Entrance.—Experimental Buoy Lighted by Gas.*—Sanction has been given to the Suez Canal Company, to place, experimentally, a buoy lighted by gas at the entrance to port Saïd; it will be a red light of the lowest order, exhibited on the 11th May, 1881, and continue to be shown for fifty days from that date. The buoy (Pintsch system) will be placed at hectometer 31, a short distance off the extremity of the western breakwater, in a line with the outermost western light-vessel, and the first of the western line of light-vessels showing red lights. It will thus be an additional light on the line of red lights.

186.—INDIAN OCEAN.—*Madagascar.—East Coast.*—The following shoals have been reported :—

(1.) *Reported Extension of Prune Islet Shoal.*—Captain Foot, H.M.S. *Ruby*, reports that this shoal now extends in a N.E. $\frac{1}{2}$ E. direction for a distance of 9 miles, thus joining Marie Eugénie shoal. The space between the two shoals is impassable for shipping during on-shore winds; the sea breaks heavily over the whole extent.

(2.) *Shoal Reported off Fénériver.*—There is also a shoal lying about 8 miles E. by N. from Fénériver, said to have been seen breaking from that place. Position as given, lat. $17^{\circ} 20' S.$, long. $49^{\circ} 34' E.$

187.—AFRICA.—*East Coast.—Zanzibar Island.*—Information relative to the progress made in the construction of lighthouses on the coast of Zanzibar island, February, 1881 :—

(1.) *Rás Kizimkazi Lighthouse.*—Building on Rás Kizimkazi, the southern point of Zanzibar island; intended to be about 90 feet high, square. The building had reached the height of 12 feet, and the trees had been cut down in the vicinity. Position, lat. $6^{\circ} 28' 0'' S.$, long. $39^{\circ} 29' 15'' E.$

(2.) *Lighthouse near Mungopani.*—Situated on a cliff about 40 feet above the sea, near the village of Mungopani, 12 miles northward of Zanzibar; about 90 feet in height and consists of a

square whitewashed tower with red top. The building was complete externally, but there was no staircase, or light apparatus. Position, lat. $5^{\circ} 58' 45''$ S., long. $39^{\circ} 11' 10''$ E.

(8.) *Lighthouse on Mwana Mwana Island*.—On the northern extremity of Mwana Mwana island, western side of entrance to Koktoni harbour; in course of construction, and at present about 14 feet high. Position, lat. $5^{\circ} 45' 10''$ S., long. $39^{\circ} 13' 10''$ E.

(4.) *Rás Nungwe Lighthouse*.—On Rás Nungwe or Hog point the north extreme of Zanzibar island, is completed; light in course of exhibition and about 105 feet above the sea; but its action at present is not to be relied on. The lighthouse consists of a square whitewashed tower with red top. Position, lat. $5^{\circ} 43' 15''$ S., long. $39^{\circ} 17' 40''$ E.

188.—INDIA.—*Malabar Coast*.—*Tellicherry*.—The light will in future be exhibited from a tower near the flagstaff, and at an elevation of 70 feet above the sea, instead of from the flagstaff as heretofore.

189.—INDIA.—*Gulf of Manár*.—*Paumben Pass*.—In consequence of certain repairs at the Paumben lighthouse, the range of visibility of the light is diminished, and will only be seen about 7 miles off.

190.—INDIA.—*Bay of Bengal*.—*Cocanada*.—*Buoyage off Point Gordeware (Godavery)*.—The large red buoy, with pole and basket, has been removed from its former position (viz., 2 miles southward of Gordeware point) and is now placed in $6\frac{1}{2}$ fathoms, east water, to the northward of the Godavery shoals—the black buoy, formerly in that locality, being now taken up. The dry sandy point Gordeware will be marked by a tripod beacon surmounted by a pole with basket. The bearing of Hope island light from the red buoy is S. by W. $\frac{3}{4}$ W.; the Vakalapudi light bears from the buoy N. by W. Approaching Cocanada from the southward by night, a ship should not haul in for Vakalapudi light till it bears W. N. W.; by day, she should pass fully half-a-mile northward and eastward of the buoy.

191.—CHINA SEA.—*Cochin China*.—*Annam*.—*Rock reported North-west of Turtle Island*.—On 20th January, 1881, the steam-vessel *Octavia* on her passage from Bangkok to Hong Kong,

after passing between Turtle (Tortoise) island and the mainland, struck on a rock reported to be in lat. $14^{\circ} 30' N.$, but without further information as to its position. The vessel at the time was drawing 18 feet; the hull sustained damage.

192.—RUSSIAN TARTARY.—*Peter the Great Bay*.—*Port Vladivostok*.—(1) *Cape Goldboin Lights*.—*Intended Alteration in Colour*.—To be fixed red lights, instead of fixed white as previously.

(2) *Intended Harbour Lights at Vladivostok*.—They will be two double harbour lights on the Admirals' landing pier at Vladivostok. The seaward lights will be two white lights; and inshore a fixed red light (eastern), and a green light (western).

193.—AUSTRALIA.—*East Coast*.—*Moreton Bay*.—*Brisbane River*.—(1.) *Additional Leading Lights at Lytton*.—Two leading lights are now exhibited from the beacons above the boat-shed, on the south shore at Lytton. The upper light is white, the lower one red. These lights in line lead through mid-channel between the red and black buoys off the boat passage.

(2.) *Upper Flats*.—*Alterations in Lights*.—The leading lights previously exhibited on the beacons above Parker island, and below the Flats, have been transferred to the triangular beacons on the south shore above the Flats, Brisbane river; these lights kept in line lead through the new cutting, which is 100 feet wide, with a depth of 15 feet at low water spring tides.

(3.) Lights are also exhibited from the beacons below Cairncross house, which lead through the cutting in Hamilton reach.

194.—SOUTH PACIFIC.—*Ellice Islands*.—*Discovery of a Coral Bank*.—The master of the *Rose* reports a large coral bank to south-eastward of Sophia island, in lat $11^{\circ} 3' S.$, long. $179^{\circ} 50' E.$ (position approx.) Soundings were taken in 18 to 15 fathoms; the bottom was visible and seemed flat. No land was seen from the masthead.

195.—UNITED STATES.—*Pacific Coast*.—*California*.—*Fog-signal at Point Reyes Light-station*.—On and after June 1, 1881, a first-class steam siren, giving blasts of five seconds duration, at intervals of seventy seconds, will be sounded, during thick and foggy weather, at point Reyes light-station, California, instead of the steam-whistle now in use.

196.—SOUTH AMERICA.—Brazil.—*Light at Cape Marca (Lagoa dos Patos).*—A fixed white light, elevated 53 feet above the sea, and visible twelve miles, is shown from a circular tower erected on Cape Marca, about 80 yards from the position of the old light which was extinguished. The lower is of iron and painted white as is the keeper's dwelling. Position given, lat. $31^{\circ} 18' S.$, long. $51^{\circ} 26' W.$

197. UNITED STATES.—*Gulf of Mexico.*—Louisiana.—*Light-vessel with Fog-signal on Trinity Shoal.*—On or about June 1, 1881, a light-ship will be moored off the coast of Louisiana, $1\frac{1}{2}$ mile to the northward of Trinity shoal, and 8 miles inside its extreme western end, in $3\frac{1}{4}$ fathoms of water. The vessel is schooner rigged and painted red, with the words "Trinity Shoal" on each side in large white letters, and "No. 43" on the stern. A fixed white light will be shown from the foremast-head, at about 40 feet from the level of the sea, and visible about 11 miles. At each masthead there will be displayed circular lattice-work day marks painted red. The approximate position is lat. $29^{\circ} 12' N.$, long. $92^{\circ} 14' W.$ Calcasieu lighthouse bearing W.N.W., distant $6\frac{1}{4}$ miles, South-west reef lighthouse bearing N.E. by E. $\frac{1}{4}$ E., distant 42 miles; Ship shoal lighthouse bearing E. $\frac{3}{4}$ S., distant 63 miles. This light serves to guide vessels through the channel between Tiger and Trinity shoals and to mark the latter shoal. During thick and foggy weather there will be sounded on this vessel a 12-inch steam fog-whistle, giving blasts of 4 seconds' duration each minute,

198.—UNITED STATES.—*Block Island Sound.*—*Whistling Buoy on Cerberus Shoal.*—A whistling buoy painted with horizontal stripes, and giving blasts of a whistle at short intervals, is now moored south-east of Cerberus shoal or Middle Ground, eastern entrance to Long island sound, in 7 fathoms of water, on the following compass bearings: Montauk lighthouse, S.S.E. $\frac{1}{2}$ E.; Watch hill lighthouse. N.E. $\frac{3}{4}$ N.; Race rock lighthouse, N.W. $\frac{3}{4}$ N.; Gardner's island lighthouse, W. $\frac{1}{4}$ S.

CHARTS, &c., PUBLISHED BY THE HYDROGRAPHIC DEPARTMENT,
ADMIRALTY, IN MARCH AND APRIL, 1881.

		<i>s.</i>	<i>d.</i>
77	South America, west coast :—Trinidad channel ...	2	6
01	China :—Wusung or Wongpu river ...	2	6
78	Sandwich islands :—Honolulu harbour ...	1	0
105	Norway, west coast :—Stav fiord to Romdals islands. (Plans, approaches to Aalesund. Approaches to Freko)	2	6
632	Africa, west coast :—Walfisch bay to Orange river. (Plans, Port D'Itheo. Spencer bay. Hottentot bay. Ichabo. Angra Pequena. Elizabeth bay)	2	6
1410	England, west coast :—Bristol channel to New Quay. (Plans, Port Cardigan. Fishguard bay) ...	2	6
1872	North sea :—Calais to the River Schelde entrance.	2	6
553	South America, east coast :—Cape dos Bahias to Tova island	1	6
886	Canary islands :—Ports Naos and Arrecife ...	1	0
2414	China sea :—Gulf of Siam	2	6
358	Japan :—The western coasts of Kiusiu and Nipon, including the Korea strait	2	6
601	Africa, west coast :—Isles do Los to Sherbro island	2	6
733	Red sea :—Hanfelah bay.		
2454	Plan added. Port Bolinao.		
61	Plan added. Fushiki anchorage.		
2728	Plan added. Luanco harbour.		
2168	Plans added. Cumsbewa ; Selwin ; Skincuttle inlets.		
894	Plan added. Coche island anchorage.		
1285	Plan added. Salavery road.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

2430. North America, west coast :—Queen Charlotte islands.
1869. Canary islands :—Gran Canaria.
1963. China :—Chelang point to Chanan bay.
2024. New Zealand :—Wangaruru harbour.
10a. Indian ocean :—South-east coast of Arabia.
2056. Indian ocean :—Sunda strait and its approaches.

1989. Nova Scotia :—Pictou harbour.
 2363. Pacific ocean :—Tongatabu.
 2389*a*. Australia, south coast. St. Vincent and Spencer gulfs.
 554. South America :—Magellan strait.
 755. Pacific ocean :—Union group.
 1922. North America, west coast :—Fraser river and Burrard inlet.
 2189. North America, west coast :—Ports in British Columbia.
 2842*b*. Baltic sea.
 750. India, west coast :—Cundacudvoo to Anjengo.
 2691. Pacific ocean :—Fiji islands.
 120. North sea :—Schelde river.
 1967. Borneo :—Pantai and Bulungan rivers.
 375. Labrador :—Sandwich bay to Nain.
 1848. Borneo :—Natuna islands.
 2135. Bay of Bengal :—Irawaddy river, sheet 1.
 588. South America, west coast :—Tom bay anchorages.

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE
 HYDROGRAPHIC OFFICE, ADMIRALTY, 1881.

- No. 1.—NEW ZEALAND PILOT. Relating to portions of the coast of New Zealand.
 No. 2.—MEDITERRANEAN ARCHIPELAGO. Relating to Zurafo rookery, Imbros island, Belo Poulo, Karavi and Falconera islets.
 No. 3.—MEDITERRANEAN PILOT, vol. I. Relating to the east coast of Spain, the Balearic islands, Messina harbour, and the coasts of Sardinia.
 No. 4.—AFRICA PILOT, part II. Remarks on portions of the west coast of South Africa (chiefly situated between the Orange river and Walfisch bay).
 No. 5.—NEWFOUNDLAND PILOT. Relating to the coasts of Newfoundland and Labrador.
 No. 6.—SOUTH AMERICA PILOT, part II. Relating to Trinidad channel and approaches.
 No. 7.—SOUTH AMERICA PILOT, part I. Relating to the east coast of South America, and to the Falkland islands.
 No. 8. PACIFIC OCEAN, SOUTH-WESTERN PART. Relating to New Ireland, New Hanover, and Bougainville island.

- No. 9.—CHINA SEA DIRECTORY, vol. II. Relating to the Main route, China sea; north-west coast of Borneo; Balabac strait; west coast of Luzon; gulf of Siam; and coast of Cochin China; also to the passage between Sulu and China seas.
- No. 10.—CHINA SEA DIRECTORY, vol. III. Revised sailing directions for the entrances to the Yang-tse-kiang, and for Wusung river.

BOOKS.

s. d.

- the west coast of Hindostan Pilot, including the gulf of Manar, the Maldivh and Lakadivh islands. Second Edition, 1880 4 0
- Sailing directions for the west coasts of France, Spain, and Portugal. From Ushant to Gibraltar strait, including the African coast from cape Spartel to Mogador. Third edition, 1881 4 0

OUR OFFICIAL LOG.

OFFICIAL INQUIRIES AT HOME, 1881.

975. *Garnet*, s.s.; built at Dundee, 1880; owned by Mr. P. M. Duncan and others; tonnage, 645; Burntisland to Flensburg; coals; supposed to have foundered at sea. Inquiry held at Dundee, April 8, 1881, before Rothery, Wreck Commissioner; Forster and Castle, N.A. Loss probably due to the vessel having been overladen.

976. *Jupiter*, barque; built at Sunderland, 1870; owned by Mr. J. Steel and others; tonnage, 719; Hamburg to Newcastle; coals; stranded on Goswick Sands, March 7, 1881. Inquiry held at North Shields, April 2, 1881, before Spence and Swan, Justices; Clark and Harland, N.A. Casualty due to prevalence of thick weather. Master free from blame.

978. *Bavelaw*, barque; built at Quebec, 1862; owned by Mr. J. Dixon and the master; tonnage, 1,027; New York to London; petroleum and ballast; abandoned at sea, Feb. 23, 1881.

Inquiry held at North Shields, March 29, 1881, before Hedley and Jackson, Justices; Visconti, Beasley and Ward, N.A. Abandonment justifiable.

979. *Pretoria*, s.s.; built at Jarrow-on-Tyne, 1877; owned by Mr. J. J. Cohen and others; tonnage, 815; the Tyne to Copenhagen; coals; stranded on Furo Reef, December 18, 1880. Inquiry held at South Shields, April 9, 1881, before Nelson and Moore, Justices; Parfitt and Beasley, N.A. Master in default for negligent navigation and for being intoxicated. Certificate suspended for twelve months.

980. *Summerlee*, s.s.; built at Glasgow, 1877; tonnage, 832; Bilbao to Glasgow; iron ore; stranded on Ailsa Craig, March 22, 1881. Inquiry held at Glasgow, April 11, 1881, before Pollock and Graham, Justices; Cowie and Murdoch, N.A. Master and mate both in default for negligent navigation. Certificates suspended for six and three months respectively.

983. *Stamford*, s.s.; built at Sunderland, 1880; owned by the Standard Steamship Company; tonnage, 869; lost off the coast of Ushant, February 3, 1881. Inquiry held at Sunderland, April 14, 1881, before Booth and Ritson, Justices; Cowie and Murdoch, N.A. Master in default for negligent navigation. Certificate suspended for four months.

984. *Kingston*, s.s.; built at Pallion, Sunderland, 1871; owned by the Commercial Steamship Company; tonnage, 922; Cardiff to Aden; coals; lost on Shab Ali Reef, February 16, 1881. Inquiry held at Westminster, April 13, 1881, before Rothery, Wreck Commissioner; Kennedy and Clarke, N.A. Casualty due to master neglecting to verify the position of his vessel. Certificate suspended for six months and recommended for one as mate.

987. *Erl King*, s.s.; built at Point House, Lanark, 1865; owned by Mr. W. Ross; tonnage, 1,706; New Orleans to Liverpool; oil cake, cotton, &c.; shipped a very heavy sea, which washed away some of the bales of cotton stowed on deck, and one of the crew, who was drowned, March 6, 1881. Inquiry held at Westminster, April 19, 1881, before Rothery, Wreck Commissioner; Comyn and Anderson, N.A. No blame attached to master.

993. *Day Spring*, schooner, built in Nova Scotia, 1864; owned by Mr. F. McKeivitt; tonnage, 175; the Tyne to Waterford; coals; lost on the shoals in Waterford Harbour, March 3, 1881, when loss of life ensued. Inquiry held at Waterford, April 26, 1881, before Mollan, Judge; Burney, Curling and Vaux, N.A. Loss due to stress of weather and to the master not being in possession of a proper chart of the harbour.

994. *James A. Harley*, brig; built at Southwick, Durham, 1866; owned by Thomas Harley and others; tonnage, 228; Cork to the Tyne; limestone; lost on Hasbro' Sands, March 24, 1881. Inquiry held at Cork, April 25, 1881, before Mitchell, Judge; Harris and Kennedy, N.A. Accident due to master mistaking the Would light, for the lightship on the Hasbro' Sands. Cautioned to be more careful in future.

995. *Capulet*, s.s., and *Hamburg*, s.s.; both owned by the General Steam Navigation Company, the former measuring 201 tons and the latter 303 tons; on voyages from London to Havre, and Boulogne respectively; in collision in the Lower Hope Reach, River Thames, March 4, 1881. Inquiry held at Westminster, April 26, 1881, before Rothery, Wreck Commissioner; Parfitt and Harland, N.A. Accident caused by the master and mate of the *Capulet* having navigated their vessel in an incautious manner, and not having kept a good look-out. Certificates not dealt with.

998. *Estella*, s.s.; built at South Shields, 1879; owned by Mr. John Lewis; tonnage, 955; Carthage to Fleetwood; iron ore; sustained material damage by striking the rocks in Morecambe Bay, and subsequently stranded off Fleetwood, April 15, 1881. Inquiry held at Liverpool, May 4, 1881, before Raffles, Judge; Parfitt and Kennedy, N.A. Master acquitted of default.

999. *Alfred*, brig; built at Summerside, Prince Edward's Island, 1871; owned by Mr. J. A. Nicholson; tonnage, 253; Coosaw, Bull River, to Swansea; phosphate rock; abandoned at sea, March 5, 1881. Inquiry held at Swansea, May 4, 1881, before Fowler, Judge; Hight and Ward, N.A. Vessel prematurely abandoned, for which the master was to blame. Certificate suspended for three months. Recommended for one as mate.

1000. *James Harris*, s.s. and *Andalusia*, s.s.; the former built

at Middlesborough, 1874 ; owned by Mr. J. Hogg ; tonnage, 577 ; Middlesborough to Grangemouth ; pig iron ; the latter built at Maryhill, Lanark, 1863 ; owned by Mr. W. J. Armstrong ; tonnage 159 ; Grangemouth to Calais ; pig iron ; in collision off the mouth of the Tees, April 14, 1881, when the *James Harris* foundered and 14 lives were lost. Inquiry held at Westminster, May 5, 1881, before Rothery, Wreck Commissioner ; Pickard, Castle and Beasley, N.A. Court held that both vessels were proceeding at too great speed on a foggy night, but the officers of the *James Harris* having lost their lives, and the mate of the *Andalusia* (uncertificated) having been in charge at the time of the collision, the Court did not deal with the certificate of the master.

1001. *Newton*, s.s. ; built at Greenock, 1864 ; owned by the Liverpool, Brazil and River Plate Steam Navigation Company ; tonnage, 837 ; Bahia to Liverpool ; sugar, coffee, &c. ; Lost near the Ford Lighthouse, Madeira, April 9, 1881. Inquiry held at Liverpool, May 6, 1881, before Raffles, Judge ; Parfitt and Kennedy, N.A. Master in default for steering a course too close to the land. Certificate suspended for six months.

1002. *Yeddo*, s.s. ; built at Kingston-on-Hull, 1871 ; owned by Messrs. Wilson ; tonnage, 1470 ; Hull to Boston ; general cargo ; stranded on the Long Sand, April 14, 1881. Inquiry held at Westminster, May 7, 1881, before Rothery, Wreck Commissioner ; Curling and Vaux, N.A. Accident caused by the master miscalculating his distance from the Shipwash Lightship, in mistaking the Sunk for the Kentish Knock Lightship, and for neglecting the use of the lead. Certificate suspended for six months.

OFFICIAL INQUIRIES ABROAD, 1880-1.

974. *Mary Graham*, barque ; *Harriet Upham*, barque ; in collision in the harbour of Pensacola, February 27, 1881. Naval Court held at Pensacola, March 17, 1881. Accident due to a heavy squall.

977. *Laura B.*, brig ; lost on Ginger Bread Ground, Biminish, February 28, 1881. Inquiry held at Nassau, March 8, 1881. No blame attached to master.

1. *India*, barque; abandoned at sea, January 2, 1881. Inquiry held at Cape Town, March 9, 1881. Abandonment liable.
2. *Sissie*, s.s.; abandoned by master and chief engineer, January 21, 1881. Inquiry held at Penang, February 12, 1881. Officers much to blame. Certificates cancelled.
5. *Fanny*, barque; lost at Tomako, December 12, 1880. Inquiry held at Sourabaya, March 3, 1881. Casualty caused by cables parting. Master exonerated.
6. *Macgregor*, s.s.; stranded at Comare, January 14, 1881. Inquiry held at Butticaloa, Ceylon, February 15, 1881. Master from blame.
8. *Ridge Park*, s.s.; lost on Beware Reef, February 10, 1881. Inquiry held at Sydney, February 24, 1881. Master and mate in default. Certificates suspended for three months respectively.
9. *Collaroy*, s.s.; stranded on Long Reef, January 20, 1881. Inquiry held at Sydney, February 21, 1881. Master and mate in fault for negligent navigation. Certificates suspended for three months respectively.
10. *Annie Beaton*, schooner; suffered loss of mast, January 7, 1881. Inquiry held at Cossack, W. Australia, January 17, 1881. Casualty due to stress of weather. No blame attached to master.
11. *Dawn*, schooner; suffered loss of mast, &c., January 7, 1881. Inquiry held at Cossack, W. Australia, January 17, 1881. Casualty due to stress of weather. No blame attached to master.
12. *Kungwo*, s.s., and *Han Yang*, s.s.; in collision in the Kiang-Kiang River, November 19, 1880. Naval Court held at Shanghai, March 7, 1881. Accident due to an error of judgment on part of the master of *Kungwo*. Severely censured.
16. *Corea*, s.s.; stranded on A Reef, May 2, 1880. Inquiry held at Brisbane, June 1, 1880. Mate to blame for not keeping a good lookout. Severely reprimanded.
17. *Gulf of Finland*, s.s.; stranded near Cape Jaffa, Feb. 15, 1881. Inquiry held at Melbourne, February 23, 1881. Master in fault for negligent navigation. Certificate suspended for three months.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. W. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London W.C.; 6, Lord Street, Liverpool; and 10, Berridge Street, Leicester.

ENGLISH (APPLICATIONS).

1687. Thomas Utley and John Fawcett, both of the U.S. "Improvements in stalls and ventilating apparatus, chiefly designed for facilitating the transport of cattle in sea-going vessels."

1693. Wilhelm Rudolph Reimers Becker, Hamburg, German. "Improvements in automatic sea-sounding apparatus." (A communication.)

1700. Frank W. Rainey and Thomas B. Rogers, both of New Orleans, Louisiana, U.S.A. "Improvements in the construction of compartments in ships for preventing the displacement of the cargo and the spread of fire or contagious disease." (A communication.)

1708. Lewis Henry Raymond, New York, U.S.A. "An improved boat plug." (A communication.)

1715. Josiah Hornblower, Bromley, and George Thomas Dove, Limehouse. "An improved ship's steering-gear."

1717. Albert Lungley Dickins, Middleton, near Manchester, and Charles Ogden, Heaton Norris. "Improvements in compound marine steam engines."

1724. Oscar B. Crane, Thomas M. Platts, and Willis H. Homes, all of U.S.A. "Improved apparatus for regulating or controlling the speed of marine engines."

1752. Charles Jones, Liverpool. "Improvements in and applicable to screw-propellers."

1790. Samuel Joseph Woodhouse, Leeds. "Improvements in diving costumes and apparatus connected therewith, such as explosives and means of firing the same in the breaking up of wreckage, &c."

1853. John Isaac Thornycroft, Chiswick. "Improvements in propelling and steering apparatus for ships or vessels."

1868. William Nelson Hutchinson, Wellesbourne, Bideford. "Projecting torpedoes, and for improvement in submarine torpedoes."

1892. Henry Boyce, Samuel George Boyce, and Samuel Callaway, all of Sandown, Isle of Wight. "Improvements in the construction of fishing nets."

1938. Martin Henry Gerring, Farrington, and Robert Edwin Rumsey, Lewisham. "Improvements in the main and thrust block bearings of the main crank shaft and propeller shaft of steam-vessels, and in preventing such shafts and bearings from becoming overheated."

2084. Bertie Charles Scott, Chester Terrace, Regent's Park, Middlesex. "Certain improvements in the application and construction of capstans."

2088. John Morecambe Bromley Baker, Southampton Buildings, Middlesex. "Improved means of and apparatus for conveying intelligence from one vessel to another, or from vessels to the shore."

2121. John B. Root, Port Chester, New York, U.S.A. "Improvements in and relating to screw-propellers for steamships." (A communication.)

2125. Augustus Figge, Old Cavendish Street, Middlesex. "Improvements in apparatus for propelling and steering vessels."

2130. Heinrich Hindemann, Wilhelmshafen, Germany. "Improvements in steering apparatus for ships to produce an even tension with rope or chain at all positions of the helm to avoid 'slack.'" (A communication.)

AMERICAN.

239488. James Buchanan, Indianapolis. "A device for hauling canal boats."

239761. John Gates, Portland, Oreg. "A steering apparatus for ferry boats."

239872. Charles T. Soniat, New Orleans, La. "A seat for row-boats."

239877. Andrews J. Stevens, Sacramento, Cal. "A friction brake for steering apparatus for vessels."

239905. Thomas B. Wilson, Crockery, Ottawa, Mich. "Reefing sails."

240504. Samuel S. Campbell and Joseph H. Castman. "A ship's signal."

240611. Paul S. Redfield, Providence, R.I. "An angling float."

240613. John B. Root, Port Chester, New York. "A screw-propeller."

240630. Henry E. Willard, Cape Elizabeth, Me. "A fishing apparatus."

240663. Edward J. F. Coleman, Providence, R.I. "A headlight for boats."

240765. Charles W. Rich, Whitehall, New York. "A vibrating propeller."

CANADIAN.

11894. Andreas Olsen, Ephraim, Utah, U.S. "Improvements on steam-vessels."

11933. John H. Laskey, and Isaac F. Dobson, Boston, Mass., U.S. "A self-levelling dining-table for vessels."

FRENCH.

139187. Lundborg. "Improvements in the hulls of vessels."

139248. Brion. "An improved method for raising sunken vessels or ships and other submerged bodies, raising and lowering and transporting heavy weights, and also for loading or unloading vessels or ships, railway trucks or waggons and other vehicles."

139394. Ziegler. "A hydro-pneumatic moderator for marine engines."

139470. Bouran, Paris. "Applying pulsometers to navigation."

139494. Paque, De Paris. "Ships' lanterns with double-air currents."

139516. Dobson. "Improvements in suspension tables, cattle-stalls, and other suspended objects on board ship."

139573. Thomas. "Improvements in screw-propellers."

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ATLANTIC CATTLE SHIPS.

IN an article in our May number on the "Atlantic Cattle Trade," it was remarked that public attention had been directed to the heavy losses of cattle which occasionally take place, and those losses were traced to three causes; exposure in winter, want of proper ventilation, and the employment of vessels unsuited to the trade. It is generally believed that much benefit has resulted to the British consumer, if not in an actual reduction of the price of meat, certainly in the stoppage of that gradual rise in prices which threatened ultimately, as regards a large part of the public, to be all but prohibitory, and it is much to be desired that the Government should not find it necessary to interfere with the free development of so important a trade. We believe for these reasons that we shall be performing a useful office in directing attention to the causes of the losses of cattle, with a view of ascertaining how far they are temporary and are likely to disappear when the conditions of successful conduct of the trade are better understood. The importance of the subject is shown by the fact that in each of the summer months, there are nearly forty arrivals of vessels with cattle at the port of Liverpool, while in winter there are about half that number, and the traffic is steadily increasing.

In addition to the more important causes of heavy loss referred to in the article in our May number, it must be mentioned that there are other conditions of the trade which account for many deaths at all seasons of the year. In some instances large numbers of animals have been shipped in an unhealthy condition, as in the case during the past winter where a number of oxen which had been injured in a railway accident were nevertheless sent off to Europe and died a short time after leaving the port of shipment. Large losses have also occurred through disease of the digestive organs caused by the change from green food to hay and corn aggravated by the fact that the animals were at the same time unable to get any exercise. It is said that disease of this kind is prevented by giving the animals water obtained by distillation and unfiltered.

Possibly in the future of the trade it may become practicable to carry a stock of green food kept fresh by means of refrigerating apparatus. Great losses have also been occasioned by the want of efficient attendance. It is found to be exceedingly difficult to obtain men who are willing, and at the same time competent, to take charge of the cattle from America to England, and often from sea sickness the attendants are disabled at the time they are most needed. In one steamer in September last, half of a large consignment of cattle died from want of attention and a similar proportion of oxen were lost from the same cause in another vessel in January. In one of these cases, finding that the men engaged to attend on the cattle were utterly useless, the officers and crew of the vessel did their work for them and thus prevented the total loss of the animals. We believe that some of the companies whose vessels regularly run in the cattle trade, contemplate in future engaging men in England as cattle attendants, who will be upon the ship's articles and go to sea regularly as do the seamen and firemen. It would appear desirable that animals should not be carried on the weather-decks of steamers in winter, and we can only suppose that in view of losses from this cause the New York Underwriters will be able to prevent it. In one steamer in December last which had a large number of cattle and sheep, nearly three-fourths of the whole died, most of them through the intense cold which the

prevailed. In all cases the animals are carried in pens roofed over and thus partially protected from the weather, but from other considerations it appears impracticable to give them such shelter as to secure them from the intense cold which is often felt in mid-ocean in the North Atlantic. If underwriters are unable to take such means as will prevent the recurrence of cases of this kind, we can hardly think that the British public will rest contented with a state of things involving such horrors as the slow deaths from exposure to cold of hundreds of cattle and sheep. Such unnecessary and inexcusable torture will, we may be sure, be prevented by Government interference, if by no other means.

Much loss has been caused by defective ventilation, but this we believe will be remedied as the trade develops and the conditions of its successful conduct are better understood. A few instances will indicate the cause of losses of this class. In the early part of last year one steamer lost nearly two-thirds of a large consignment of cattle carried under the upper-deck in consequence of its being necessary to batten down the hatches of the upper-deck in bad weather, there being little other ventilation. In another case, about the same time, the provision for ventilation consisted of booby hatches built upon the ordinary coamings on the weather deck. Two such booby hatches were fitted at each end of the vessel, but so insecurely, that in heavy weather they were carried away. Fortunately for the ship it was possible to batten down the ordinary hatches, but there being no cowls or other means of ventilation, the greater part of the cattle in the 'tween-decks were suffocated. Other cases have occurred where a large proportion of the cattle have died in consequence of its being found necessary to batten down the hatches when there was otherwise insufficient provision for ventilation. Experience has, in many cases, led the owners of these vessels to have cowls fitted in order to ensure ventilation in all weather. That by the use of proper means it is easy to ensure a supply of fresh air to any number of cattle carried below, is shown by the fact that a steamer recently landed in Liverpool in good condition a large number of cattle which were not only carried on the weather-deck and on the deck next under it, but also on the orlop-deck, and some even in the hold. While

on this part of our subject, it may be desirable to advert to the fact that ventilators in cattle ships may be, and indeed have been, a source of danger. Cowl ventilators are often placed in the parts of the upper-deck that if the vessel ships a sea and the cap-pens are carried away, the ventilator is liable to be also displaced by some of the débris. A better plan than cowl ventilation has recently been adopted in some vessels built for the cattle trade. Turret coamings standing above the upper-deck have been built of iron, and of such a height that the hatches can be left off, and are securely constructed as not to be in danger from the sea.

A large number of losses of cattle have been caused by the violence of the sea, and we believe these are the most important cases because they are, in some instances, due to the employment of the trade of vessels unfitted for it, and hence are likely, as the trade increases, to increase rather than decrease. It has indeed been thought that, because the cattle trade was incompatible with first-class passenger traffic, anything was good enough for it. This has led in the past to loss, and in all probability in the future such loss will be accompanied by disaster. It cannot be too much insisted upon, that the Atlantic cattle trade is carried on under conditions altogether different from the carriage of animals from Ireland and the Continent. The weather in the North Atlantic is nearly always in winter, and often in summer, is of such a character, that descriptions of its perils are often received with incredulity by those who have neither experienced it, nor seen its results. The frequent demolition of boats carried at heights of over twenty feet above the smooth water level in first-class ocean steamers, affords indisputable evidence of the height of Atlantic waves, more valuable than any observations made at sea under confusing conditions. Amid such seas, the condition of the crew of a vessel whose decks are nearly covered by cattle and cattle pens must surely be a most unenviable one. Instances are not uncommon in which waves have swept the decks and smashed up cattle and pens into a mass of blood-stained wreckage. In the autumn of last year, there was one case of a cattle steamer in which a sea swept the whole of the cattle pens down and most of the cattle overboard, at the same time smashing three boats, destroying the chart-house, and carrying overboard

two of the crew who were lost. Less than ten oxen were found alive on the deck. In another more recent case of a vessel which shipped a sea and which had iron bulwarks, a number of the cattle were drowned on the deck although the vessel had scuppers and wash ports of more than the usual size. One difficulty of the situation is, that on account of the position of the cattle and cattle pens the wash ports cannot be got at, and the largest port may be effectually closed by a dead beast. The conditions of the trade are such as to prevent the manure and waste food of the cattle being cleared away, and, unless washed off by the sea, it remains on the deck till the vessel reaches her destination. It may indeed be said, that the safety of steamers which have their decks so lumbered with cattle when exposed to such conditions of weather as we have described, depends simply on the fact that the cattle and wreckage of cattle pens can generally be easily got rid of, even when the sea does not itself sweep them away.

It is also a necessary condition of safety that vessels employed in the cattle trade should be of such form that in the special conditions of loading they should have ample stability. By this we mean good initial stability. Most merchant vessels which are deficient in initial stability have nevertheless, with an ordinary freeboard, a large range, and many crank ships would have stability even at an inclination of 90 degrees and are, in fact, in that respect, uncapsizable, always supposing that no weight could shift or water get in the ship. This is all, however, of little use, the danger of small initial stability being that when the vessel gets a list, it soon becomes permanent by shifting of coals or cargo, and then goes on increasing till water enters through some of the engine-room or other openings and thus at last the ship may sink or capsize. A vessel with close bulwarks, liable as we have said to have her water ports lumbered and rendered useless, should have a still greater amount of stability seeing that she may have large masses of water on her decks. Stability is not to be obtained in the American trade merely by means of the cargo, whatever the form of the ship; of the cargo, the heaviest items are wheat, maize, and bacon in boxes. Flour in bags is, it is true, heavier; it may form a small part of the cargo, but the consignments of this

article are not sufficiently large for any vessel to be able to depend upon advantages that might be obtained from its somewhat greater weight. There are certainly ocean steamers which could only carry cattle on two upper decks, and an ordinary American cargo ship with safety, by using ballast to obtain a proper margin of stability in the upright position.

The usual cattle pens are constructed of quartering and deal held together by screw bolts and boarding nailed on them, and are kept in their places by such slight means that a heavy sea detaches them without damage to the structure of the ship. Hence, when the sea causes a wreckage which would otherwise be a source of danger to the ship, it is easily cleared away. The question however arises whether, as the trade becomes settled, vessels can not be fitted with more permanent arrangements for the carriage of cattle not strong enough to sustain the violence of Atlantic waves, but too strong and too securely connected with the ship to be swept away without damage.

Within the last month there has been a case of a vessel fitted for the cattle trade which is, in some respects, a remarkable one, and calls for notice in this connection. The s.s. *City of Limerick*, which was built at Glasgow in 1855, was till recently owned by Messrs. Inman and Co., of Liverpool, who had her lengthened and a light spar-deck added in 1871. During the present year she has been fitted at Sunderland for the Atlantic cattle trade and has had a superstructure added covering four-fifths of her length, and consisting of light angle irons each of which forms a beam and side frames, and is securely connected to the former upper-deck and deck stringer of the vessel. The sides of the superstructure are planked with pine fastened to the frames by nut and screw bolts, the planking extending a little way over the top. Along the middle of it and all fore-and-aft is some continuous planking forming a gangway; and it is intended to board over most of the remainder when the cattle are shipped, thus forming a light awning or shade deck with openings in it for air. The fore end of the superstructure is formed by an iron bulkhead about fifty feet from the stem. The cattle pens are permanent fittings framed by angle irons attached to the framing of the superstructure, and also to the

deck of the vessel. There were three small wash ports on each side. It remains to be added that the ratio of depth up to the spar-deck only was 88 per cent. of the breadth, a proportion only exceeded by five or six other seagoing vessels, while with the addition of the new deck or superstructure the depth would be more than two feet in excess of the breadth. For these reasons, the Board of Trade detained the vessel as being unsafe for the purpose for which she was presumably intended, namely to proceed to America and to bring thence cattle on two decks and an ordinary American cargo. The owner appealed against the decision of the Board, and in accordance with the Merchant Shipping Act of 1876 the case was decided by a Court of Survey consisting of the Wreck Commissioner and two nautical Assessors, Mr. Merrifield of the Education Department, London, at one time Principal of the School of Naval Architecture, on behalf of the Board of Trade, and Mr. Waron, an Engineer, on behalf of the owner. The case for the Board of Trade was that the vessel, from her dimensions, presumably, had not sufficient stability to carry cattle on the two upper-decks, and that the new structure was in itself a source of danger to the ship. There was a minor question of the security of a new hatch, built for purposes of ventilation, and there were also some legal points raised in connection with the case into which we do not propose to enter, as they were not of much public interest. The vessel was, at the time of detention, loaded to within a foot to eighteen inches of her marked load-line, her cargo consisting of iron, of which 150 tons (one-ninth of the whole) was on the orlop-deck, and the remainder stowed close and much of it very low down in the holds. The total weight was 1,312 tons, besides which she had 850 tons of coal, of which 500 was in one of the compartments of the hold, and was intended for the homeward voyage. The fact of so large a proportion of an iron cargo being stowed close and low down in the hold, of itself appeared to indicate that in the opinion of the owner the vessel was dependent for her stability rather upon something of the nature of ballast than upon her form, and the Board of Trade contention was, that to secure her stability as a cattle ship, part of this iron or some equivalent should be retained as permanent ballast. It appeared

that the two conditions, of an iron cargo of which so large a proportion was stowed very low in the ship, and a general American cargo with cattle on the two upper-decks, were incompatible, and that the one condition of stowage afforded conclusive evidence of want of safety with the other. If the ship was not much too stiff going out, and there was no conceivable reason for supposing her to have been made so, she would be crank coming home.

In regard to the question of the construction of the superstructure, a number of practical technical witnesses, shipmasters and naval architects, spoke of it as not being strong enough to resist the force of Atlantic seas, and yet too strong to be carried away without damage, as, in fact, likely to become a cage full of wreckage and carcasses of animals, rendering the ship unmanageable. The Court, however, without hearing any evidence for the owner, except as to the fact of her having carried cattle on former occasions, made a survey of the ship themselves, and decided all the points in favour of the owner, commending rather than otherwise the debateable superstructure.

THE NEW ASTRONOMICAL NAVIGATION.

By M. LE COMTE DU BOISY.

I INTEND in the present paper to give a brief sketch of the *New Navigation*, pointing out the philosophical and mathematical principles on which it is based; and I hope to do it in such a way as to render obvious, even to minds little acquainted with science, that this *New Navigation* is the only one in accordance with the aforesaid principles, and that it is truly practical in all cases that can take place at sea. But I think it necessary before beginning the demonstration, to inform your readers, how I am led to send some articles to the *Nautical Magazine*. I read in the numbers for January, February, March, and June, 1880, four papers entitled, *The New Navigation and Sumner's Method*. After a careful study I am obliged to recognize that the *New Navigation*, the first in the title, holds but a secondary place in the discussion; and I think that the author has

not sufficiently shown the two capital points of the *New Navigation*, which are the *really scientific and correct use of chronometers at sea* and the *application of the method of equations of condition* (a method constantly employed in astronomy), which leads to the *méthode du point rapproché*. Certainly the author deserves many thanks for having pointed to some very interesting questions contained in the *New Navigation*, but it is to be regretted that those questions are only secondary consequences of the capital points. He has mixed the methods of the *New Navigation* with that of *Sumner*, which is to a certain degree a mistake, for the first of these methods has sprung up from the problem of the determination of the place of the ship at sea, but the second method only from the problem of the utilization of a single altitude.

It is important to know who are the men that have produced the *New Navigation*, and the circumstances by which they were led to it. Messieurs Yvon Villarceau and Aved de Magnac—the first a most eminent astronomer at the Paris Observatory and collaborator of the late celebrated astronomer Leverrier, the second now a commander in the French Navy—are the first and the only authors who have published a book entitled *Nouvelle Navigation Astronomique*. Two other French officers who are mentioned in this book, Captain Mareq. de St. Hilaire and Lieutenant Hilleret, have also contributed to the development of the methods: the first, endowed with a profoundly acute mathematical mind, has discovered the method of the *point rapproché* without knowing the *method of equations of condition*; and the second, an eminent mathematician, has given the theory of *curves of altitude*. Undoubtedly that which is called *Sumner's Method* has been a first step towards the *New Navigation*, by the consideration of the *circle of altitude* and of the *line of position*; but it has no connection with any great astronomical theory, and thus it is no wonder that it is incomplete. I will show later on that *Sumner's Method* fails in many cases, and that one is not able to determine the approximation at which it gives the position of the ship by the intersection of two *lines of position*. Nevertheless it must be acknowledged that this method, notwithstanding its imperfection, has been a progress.

M. Aved de Magnac had particularly applied himself to the study

of nautical astronomy since his admission into the Navy ; and has been during twelve years *officier des montres*—navigating officer. In this capacity he cruised during three years on board the flagship *Victoire* on the Mexican coast [of the Pacific ; during that time he devoted himself especially to the study of chronometers, and collected three hundred and sixty rates of these instruments noting with great care daily temperatures, rollings, pitching and all other disturbing causes to which chronometers are supposed to be subject. All these data were collected with the intention of submitting the performances of chronometers at sea to the kind of calculations depending on the methods of experimental natural philosophy.

In the beginning of February, 1865, in the roadstead of Mazatlan, at the height of the fine season, an unexpected and sudden storm arose, and a large storeship, the *Rhin*, was driven ashore, and greatly injured. She had to be towed by the *Victoire* for repairs to the United States dock of Mare Island, San Francisco. At a short distance from the Californian coast the ships met with a strong gale, and on a certain evening it was very important to get the position with great accuracy. In a clear spot, near the zenith, at twilight, M. Aved de Magnac succeeded in observing a star ; the altitude was very great ; none of the known methods of nautical astronomy afforded the means of obtaining with it any result on which reliance could be placed, and thus the observation became useless.

M. de Magnac was well aware that many questions of nautical astronomy were incomplete and rather obscure ; the failure of old methods in the present case suggested to him the idea of undertaking the improvement of nautical astronomy. He soon judged that for clearing all the aforesaid questions the united efforts of a very learned astronomer and of a navigator possessing sufficient scientific attainments to understand this astronomer were indispensable, and that before and above all a *really scientific management of chronometers at sea* must be settled.

M. de Magnac, having returned to France, and having heard of the valuable works on chronometers of M. Yvon Villarceau, went to this gentleman, and asked to be shown the most systematic and

mathematical method for determining the algebraic formulæ representing the rates of chronometers at sea. This astronomer indicated the method of *indeterminate co-efficients*, but treated by *Baron Cauchy's method of interpolation*, instead of by the method of *least squares*, this last method being often quite impracticable, and its results only a trifle better than those of the former. After numerous computations, M. de Magnac obtained formulæ representing very satisfactorily the rates of the studied chronometers in function of the temperature and of the lapse of time; and his very important results were communicated to the *Académie des Sciences* in November, 1868.

Some experiments on six chronometers were made on board the seagoing training ship *Jean-Bart*, during the years 1871-72-73; they were quite in accordance with those of the frigate *Victoire*, and Messieurs Yvon Villarceau and Aved de Magnac deemed the experiments of sufficient value for establishing the rational scientific theory of the employment of chronometers at sea; and M. Aved de Magnac published a pamphlet entitled: *Recherches sur l'emploi des chronomètres à la mer* (Paris: Gauthier Villars, 1874). In this pamphlet he shows first, the method of finding the co-efficients of the formulæ representing the rates of chronometers, and the applications of these formulæ to the determinations of the longitudes of several places; and secondly, after having come to the conclusion that to obtain the daily rates of chronometers for the purposes of ordinary navigation the method of co-efficients is impracticable, he proposes to replace it by a graphic method of sufficient accuracy for making landfalls. M. de Magnac obtained the best results by this method on board the seagoing training frigate *Renommée*, and the results are given in the *New Astronomical Navigation*, where the said graphic method is explained and illustrated with great care. M. de Magnac's method is now employed with great success in the French Navy.

The author of the papers entitled *The New Navigation and Sumner's Method* speaks of Messieurs Yvon Villarceau and Aved de Magnac's *Method of Management of Chronometers at Sea* in rather an ironical manner; he says on this subject: "but our Continental neighbours are great in projection and nice calculations; they

have what may be called 'squared paper,' that is, paper so ruled as to be covered with an immense number of very small squares on a sheet of this paper having projected the point O, as in Fig. 1 they rectify it for every conceivable error, including also the chronometric curve for error and rate—indeed they undertake to correct, by some of the new methods, the error and rate of chronometer at sea. (*See Nautical Magazine* for 1880, p. 213.)*

Yes, it is true your Continental neighbours undertake the corrections of error and rate of chronometers, and obtain landfalls of admirable precision; their errors of longitude being less than three miles after voyages of more than eighty days, without having had any sight of land. Nevertheless, these Continental neighbours will be very happy and grateful, could their insular neighbours furnish them with a management of chronometers at sea as complete and accurate as, and at once more simple than, their own.

But in order that your readers may judge of the value of the method in question, let me give the opinions of very high scientific authorities on the method of which I am speaking, and some numerical results obtained by it.

In *Naval Science*, in the number for January, 1875, a writer, who gave a sketch of the subject, concludes as follows:—"This is a very useful application of these curves of absolute rates, and makes observation for rates available at sea in a much more accurate form than if the last rates deduced were used without the correction thus obtained." * * * "It is a valuable contribution to the theoretical and practical employment of chronometers, which play so important a part in the art of navigation. Too much pains cannot be bestowed on the study of these instruments, that the dependence which is necessarily placed on them may be at once intelligent and well founded."

In 1873-74, Doctor Peters, one of the most eminent astronomers

* The Comte du Boisj entirely mistakes the spirit in which the writer of the articles on Sumner's Method and the New Navigation addressed himself to the subject; as a matter of fact, he has a considerable appreciation of the French methods of discussing the *point rapproché*, and the treatment of the rates of chronometers.

of Europe, made, at the observatory of Kiel, a series of experiments on 91 chronometers of the German Imperial Navy; these experiments led to the conclusion of the perfect soundness of the method of Messieurs Yvon Villarceau and Aved de Magnac, and a letter of the Doctor, dated November 18, 1875, addressed to the former of these gentlemen, ends thus:—"You will understand that your method is now used in the German Navy."

In the United States, at the Naval Observatory of Washington, experiments were also undertaken on chronometers, and these confirmed the conclusions of M. de Magnac, as may be seen by what follows.

United States. Annual report of the Secretary of the Navy, for the year, 1876. (Extract of the report of Professor E. S. Holden, p. 303.) "This subject (studies on chronometers) draws now the attention of several public establishments in Europe and that of our Naval Observatory. * * * The French have taken the leading part in this kind of research and have ever maintained it since the publication of Lieussou: *Recherches sur les variations des chronomètres*. Subsequently, the works of MM. de Magnac and Fleuriat, lieutenants de vaisseau, have led to results which promise the fullest success. The memoir of M. Yvon Villarceau, inserted in the seventh volume of the *Annales de l'observatoire de Paris*, will remain for a long time the basis of all theoretical researches on this subject. * * * The principal theoretical difficulties which remain to be mastered are to find some short and suitable method (probably graphical) of applying the formulæ, and of determining the limits within which we may rely on those rates.

At that date, Mr. E. S. Holden did not know of M. de Magnac's graphical determination of chronometer rates, but, on the 12th of February, 1881, the Professor wrote to this officer, as follows:—"I have read with pleasure the pamphlets you have kindly sent me on the Navisphere and on the use of chronometers, and I recognise the extreme value of your methods, and the precision of your results. I shall send the pamphlets to those officers of our Navy best qualified to judge, and hope that in this way the attention of our Navy may be again directed to your researches."

M. de Magnac has determined a certain number of longitudes calculations; his results are all in accordance, within required limits, with the longitudes obtained by moon culminations or by electric telegraph. I give the comparison between longitudes determined by the latter method and those of M. Magnac, as published in his pamphlet, *Recherches sur l'emploi des chronomètres à la mer*. This comparison is truly interesting, showing the agreement of M. de Magnac's determinations with the longitudes by electric telegraph, which are the only ones perfectly accurate.

	Longitudes determined by Four Chronometers on board the <i>Jean-Bart</i> , by M. de Magnac.						Differences of these Longitudes.
	1871.			1872.			
	Hrs.	Min.	Sec.	Hrs.	Min.	Sec.	Sec.
Bahia, Brazil.	2	43	24.37	...	„	...	2 43 25.57 —1.20
<i>id.</i>	...	„	...	2	43	26.69	<i>id.</i> +1.12
Rio de Janeiro	...	„	...	3	1	57.97	3 1 59.10 —1.13
Montevideo	3	54	9.53	...	„	...	3 54 10.02 —0.49

These differences are as small as it is possible to require, especially when one considers that the instruments employed by M. de Magnac for observing the time at the respective places were only the sextant and artificial horizon, and that the number of days at sea elapsed since the departure from France until anchoring in the different roads were 46 for Bahia in 1871, and 42 in 1872; for Rio de Janeiro, 59 days, and for Montevideo, 70 days.

The scientific and practical management of chronometers at sea being perfectly settled, the time had come to investigate by means of the most improved theories the problem of the determination of the place of a ship at sea. This work was undertaken by MM. Yvon Villarceau and Aved de Magnac, and its first result has been the *New Astronomical Navigation*.

To be continued.)

ABSTRACTS OF SEA CASUALTIES, 1879-80.

THE year ended June, 1880, was remarkable for the absence of great gales on our coasts and for the consequent diminution in the number of lives lost by shipwreck and of vessels which foundered or were missing in the British coasting trade. But the improvement was apparently of a local character only, for it will be found on reference to the return under notice that the severity of the weather in other latitudes made such havoc in the ubiquitous British Mercantile Marine as almost to make up for our good fortune at home. The disappearance of H.M.S. *Atalanta*, which sailed from Bermuda on the 31st January, 1880, and is supposed to have foundered with all hands (281) is the most notable of the losses which occurred in the first three months of the year 1880. And although some special causes may have contributed to her loss, it is only fair to infer that she succumbed to one of the gales which proved fatal to so many of the vessels recorded in the return. We have frequently called attention to the inconvenient practice of including the losses of ships and men belonging to the Royal Navy in the Wreck Abstracts. The return professedly relates to the Mercantile Marine, and the fact of the lives lost in ships like the *Captain*, the *Eurydice*, or *Atalanta*, being included in the tables of lives lost, entirely vitiates the value of any statistical comparison that may be made. The losses of steamers have an unusual prominence in this return. The steamer *Alfonso* foundered in October, the *Heimdall* (2 lives), *Roscommon* (6 lives), *Tiara*, *Lufra* and *Emblehope*, in November, the *Borussia* (154 lives), *Voluna* and *Capella* in December, the *Urania* and *Bengore* (13 lives) in January, the *Constance* (12 lives), *Hindoo* (3 lives), and *Vingorla* (75 lives) in February, and the *Syrian* and *American* in April. The inquiries which were held into these losses, especially those which occurred on the 29th November, attracted attention to the loading and construction of steamers, and point to the conclusion that steamers were—and we fear are still—being sent to sea, which, although in themselves excellent ships, were, when deeply

or even fully laden, extremely dangerous from lack of stability arising out of their proportions, fittings, &c. Some of the vessels which foundered were laden with grain, and the carriage of grain accordingly became the first subject for the consideration of the Merchant Shipping Committee which was appointed by the House of Commons, and has resulted in legislation which is now upon its trial.

Some of the worst losses, however, occurred amongst coal-laden vessels, of which one became the subject of an unsuccessful prosecution, and we apprehend that there is something to be done in this direction but perhaps not in the form of legislation. The Board of Trade have ample experience of the harassing and comparatively useless effect of legislation, whilst, on the other hand, they should derive encouragement from the beneficial results of the educational system which they have adopted with regard to the dangers arising from spontaneous combustion of coal and explosions of coal-gas on board ship. It will be remembered that not many years ago there were many who advocated legislation with a view to ensuring the thorough ventilation of coal cargoes for the prevention of spontaneous combustion. Courts of Inquiry recommended such ventilation, and departments of State were petitioned to enforce it. But what was the result? Losses from spontaneous combustion increased yearly until the matter became so serious that a Royal Commission was appointed, which reported in 1876 that the system of ventilating which it was sought to make compulsory by law was directly conducive to the result which it was intended to prevent! The Royal Commissioners made certain recommendations as to the stowage of coal, and the necessity for surface ventilation for the prevention of explosions of gas, and distinctly stated that there was no necessity for legislation. After fruitless correspondence with Lloyd's and other public bodies, who, although generally professing to be national institutions, admitted, on being appealed to, that their action was actuated solely by considerations of corporate interest, the Board of Trade essayed to appeal directly to the persons interested in the safe carriage of coal by sea. Accordingly a placard was issued calling attention to the conclusions of the Royal Commissioners, and at the end of 1878, the "Official

"Caution" was first issued, which has since passed through five or six editions, and of which we understand that forty or fifty thousand copies have been circulated amongst shipowners, captains, coal-shippers, and others. The notice relates specially to explosions of coal-gas and contains the applicable recommendations, and a *précis* of all the reports of inquiries held into explosions since the publication of the Report of the Commissioners. The reason for the circulation of such a notice is that the simple and efficacious remedies suggested by the Commission are apparently unknown to, or disregarded by, the persons for whose benefit they were intended, and there appears to be good ground for such an assumption, for every case of explosion which has recently been inquired into has been found to be due to some shortcoming in the surface ventilation. Such casualties will continue to occur so long as there is a careless master or indifferent owner in the Mercantile Marine, but as they can no longer be attributed to ignorance, scant indulgence should be shown to the person found to be in default. But although it is not to be hoped that the dangers arising from coal cargoes can be altogether eliminated, there is good reason for thinking that the system of education adopted by the Board of Trade has borne better fruits than any amount of legislation would have done, even if we assume that legislation would not have been based on the wrong theory which was current prior to 1876. In the return before us, there is not a single total loss attributed to spontaneous combustion of coal or explosion of coal-gas, and only one life lost by an explosion which did only slight damage to the vessel. Although the comparative immunity from the dangers of coal cargoes enjoyed in the twelve months ended June, 1880, can scarcely be expected to be permanent—indeed we are aware that several vessels were lost by spontaneous combustion during the latter half of 1880—yet there is much ground for congratulating the Board of Trade on the striking success of their endeavours, and we would suggest that before any further legislation is approached, inquiry should be instituted into the success of the official warnings issued with regard to coal cargoes.

Besides the steamers which are known to have foundered, there

were posted as "missing," the *Joseph Pease* and *Telford*, from New York, with grain, in October, 1879 (47 lives lost), the *Joseph Ferens*, *Marlborough*, and *Kensington*, from England, with coal (74 lives lost), and the *Mino*, with guano (18 lives lost), in November; the *Llanedarne*, from the Black Sea, with linseed (20 lives lost), the *Prometheus*, from England, with coal (23 lives lost), in December; the *Rathmore*, from England, with coal (32 lives lost), in January, 1880; the *Elsie*, from England, with coal (18 lives lost), in February; and the *Galead*, from Baltic, with iron (17 lives lost), in March. Formal inquiries were held in all these cases with results similar to those which followed inquiries into the losses by foundering, viz., that sufficient care is not always paid to the loading of steamers in relation to their construction. In one case in which a prosecution was instituted, but failed, it was shown that the vessel was a strong vessel, built to the order, and we believe partly to the design of the owner, who had previously been a successful, though illiterate housebuilder. It was shown, we believe, conclusively, that the vessel was undermanned and overladen, having regard to her mode of construction, but the owner established his ignorance and *bonâ fides* to the satisfaction of a jury of his countrymen, and was acquitted. Only 25 Englishmen lost their lives on this occasion, but perhaps, fortunately, the vessel was undermanned, or the loss of life might have been greater. The inquiries also tended to show that some well-decked vessels were employed in crossing the Atlantic which were not built for the service, and were not as loaded fit to encounter the Atlantic wave in winter. We have called particular attention to the losses of steamers, as it is not impossible that many of the vessels named above with their crews might have been saved by careful foresight in loading and sending them to sea. Most of the dangers encountered by sailing vessels are old-standing and well known. Many of the dangers attending upon steamers are consequent upon the rapid extension of steam shipping, and the frequent changes in the modes of construction, which make some of the most prolific dangers inherent in the ships themselves. These changes must go on; a hard and fast rule cannot be fixed either as to the construction or loading of

s, but the authorities are bound to take care that any
ce on the part of responsible persons shall be punished,
t every item of experience as to the building and manage-
steamers and the perils to which they are subject should
e known as widely as possible in the manner adopted with
e to coal cargoes.

recent decision of a Court of Survey which on appeal
ated the case of the *City of Limerick*, leaves little room for
at the Board of Trade will be able to exercise the most
and of all the most necessary, preventive power of
n, without enormous cost to the country. On the other
e have the warning as given in the judgment in the case
Bristol City (an inquiry held at the Wreck Court), that—
—— went on to tell us that the amount of freeboard is
ery deceptive, for he said that he is now building at the
of shipowners vessels with perfectly flat decks, with the
giving the appearance of more freeboard than they have,
t in his opinion such vessels are quite unseaworthy;"
e further observation that "the statement is somewhat
g, and it will be the duty of the Court to bear it in
hen any of Mr. —— vessels come before it." The
g here, of course, is when any "cases of loss" of
—— ships come before the Wreck Court, not before the
of Survey. It appears to have been assumed and
y rightly so, that owing to their unusual and novel
ction they *will* come before the Wreck Court, because
ord "when," and not the word "if" is employed,
is most significant in the well weighed language of
ge. But, applying the test of the *City of Limerick* case,
Board of Trade were to detain one of these new ships as
and take the case into a Court of Survey, it is more
robable that the Court would order her unconditional

total number of casualties to British vessels during 1879-80
204; and the number of vessels lost or damaged was
the casualties being about 900, and the vessels lost or
d being about 1000 less than the numbers for the preceding

year. Of the 5,204 casualties, 972 resulted in total loss (or 6 less than the number for the preceding year), and the remainder in damage more or less serious.

The following table will show how slightly the losses in 1879-80 differ from the losses in the three preceding years, all of which have been more favourable to shipping than their predecessors, and undoubtedly more favourable than the statistical year which has just expired will prove to have been. And here may be said the only word worth saying in favour of the practice of ending the statistical year in June. We are thus enabled to get the wrecks of each winter in one return. In the present instance, we note that there were few destructive storms in the winter of 1879-80, whereas we shall find that the winter of 1880-1 has been singularly destructive, especially on our coasts, owing to the great storms of the 26th to 29th October, 18th January and 5th March. This fact is interesting, at least from a Meteorological point of view:—

BRITISH VESSELS LOST IN 1879-80.

	Sailing.		Steam.		Total.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Belonging to the United Kingdom	507	151,351	102	77,662	609	229,013
Belonging to British Possessions	356	68,690	7	1,272	363	69,962
Totals, 1879-80...	863	220,041	109	78,934	972	298,975
„ 1878-9 ...	923	228,217	115	70,232	1,038	298,449
„ 1877-8 ...	863	211,841	102	57,193	965	269,034
„ 1876-7 ...	1,056	234,395	99	57,095	1,155	291,490

The foregoing numbers bear the following percentages to the number and tonnage of vessels registered in the United Kingdom and Colonies respectively:—

	British Sailing.		British Steam.		Colonial Sailing.		Colonial Steam.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
1879-80 ...	2.6	4	1.9	2.8	2.8	4	4.2	5
1878-9 ...	2.7	3.6	1.9	2.5	2.9	4.7	1.2	2.9
1877-8 ...	2.6	3.5	1.8	2.3	2.7	3.8	1	2.2
1876-7 ...	3.1	3.9	1.9	2.5	3.5	4.3	1.2	1.7

Altogether, about 2.49 per cent. of British vessels in existence and 3.5 per cent. of their tonnage were lost during the year 1879-80

against 2·6 of the vessels and 3·5 of the tonnage in 1878-9; 2·5 of the vessels and 3·23 of the tonnage in 1877-8; and 3 of the vessels and 3·58 of their tonnage lost in 1876-7.

Allowing £15 per ton to be the value of steamships and £8 per ton to be the value of sailing ships, it appears that the total value of steamships totally lost was about $1\frac{1}{2}$ million sterling, and the total value of sailing ships totally lost was about $1\frac{3}{4}$ million pounds, making in all £2,844,338. This approximation is probably under the amount, but assuming that such is the case and that the cargoes lost were double the value of the vessels, which is unlikely, and assuming also that the year ending December 1880 was more destructive than the year ending June, 1880; it is not easy to account for the estimate of $47\frac{1}{2}$ millions sterling, which was represented in the *Times* of the 3rd January, to be the value of the British property lost by shipwreck in the year 1880. If the estimate of $47\frac{1}{2}$ millions includes all the loss and damage to ship or cargo subject to average, the fact should be stated, for the statement, as it appeared in the *Times*, was calculated to mislead. Reduced however to its lowest limits the annual loss of property arising from wrecks and casualties to British ships, is probably greater than the cost of the Afghan war, and the loss of life by casualties to British ships is higher than the loss of British soldiers in battle. In short, if all sea casualties could be prevented, this country could afford the luxury of "another little war" every year! Much of this loss is incidental to enterprise on the seas, and is more than compensated for by the benefits derived by this country from the wonderful development of British merchant shipping, but it is to be feared that some losses are mere unnecessary and wicked waste; that some lives are needlessly thrown away through culpable or criminal carelessness; and that, as Mr. Chamberlain recently had the courage to tell a most important deputation of shipowners, the wrecks which are constantly occurring cannot all fairly be attributed to the "Hand of God."

It will be observed from the following table showing the various descriptions of losses, that the total tonnage and average size of the vessels which foundered and were missing were higher than the average for the three previous years, although the number of vessels

so lost was lower than the average. On the other hand, the losses from miscellaneous accidents have decreased in every way, and this result is probably owing to the temporary cessation of total losses by spontaneous combustion and explosion of coal-gas to which we have already referred.

British ships lost during 1879-80 with average of losses in the three previous years:—

	Year 1879-80.			Average for 1876-7-8-9.		
	No.	Actual Tonnage.	Average Tonnage.	No.	Tonnage.	Average Tonnage.
Foundering ...	190	71,723	377	185	50,690	274
Strandings ...	577	151,138	262	607	153,731	253
Collisions ...	86	19,333	225	83	20,174	243
Other Causes	44	15,629	355	63	24,447	388
Missing Vessels	75	41,152	549	113	38,282	339
	972	298,975	308	1,051	287,324	272

It will be observed from the following table showing the causes of the foundering, strandings and other casualties (excluding collisions) of whose loss something is known, that whilst the majority of the losses were due to the weather and carelessness in navigation, no less than forty-two foundering were owing to defects in ships or equipments; and looking to the findings of Courts of Inquiry in certain cases of vessels which were missing, we have no doubt that if the latter class were tabulated according to their probable causes, the unseaworthy division would be considerably increased. It should, however, be remembered that all sorts of fishing and other small craft which scarcely ever go out of sight of land help to swell the number of unseaworthies.

CAUSES OF LOSS.

	Weather.	Defects in Ships or Stowage.	Bad Navigation or Seamanship.	Various.	Total.
Foundering ...	115	42	4	29	190
Strandings ...	297	24	186	70	577
Other Causes ...	13	2	—	29	44
Total ...	425	68	190	128	811

The above table includes all British and Colonial vessels of

every description and size which were lost during the year in the manner set forth in this table.

The cargoes carried by the vessels which were lost, excluding collisions, are shown in the following table.

CARGOES OF VESSELS TOTALLY LOST, EXCLUDING COLLISION,
1879-80.

	Ballast.	Timber.	Grain.	Coal.	General.	Fishing.	Other Cargoes.	Total.
Founderings	24	20	25	37	9	12	63	190
Strandings	123	55	37	114	59	32	157	577
Other Causes	5	7	2	4	6	6	14	44
Missing Vessels	6	4	15	23	2	6	19	75
	—	—	—	—	—	—	—	—
Total	158	86	79	178	76	56	253	886

Coal, timber, and grain are as usual credited with the greatest number of losses, but it would probably be found on investigation that the losses were about in proportion to the extent of trade. Ballast seems a most dangerous condition for a vessel to be in; and the losses (59) of vessels carrying ores and iron, and the losses (44) of vessels carrying stone, slate, &c., are also serious. The losses of vessels carrying phosphate rock from South Carolina demand attention. We have heard that the phosphate is dried for shipment, and that on a vessel springing a leak the phosphate absorbs water so freely as to render the vessel dangerously overloaded.

The grain-laden vessels which foundered or were missing were as follows:—

		Sailing.		Steam		Total.	
		No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Foundered		18	10,490	6	7,350	24	17,840
Missing		12	9,715	3	2,974	15	12,689
		—	—	—	—	—	—
		30	20,205	9	10,324	39	30,529

Of the 39 missing and foundered grain-laden vessels 12 were colonial sailing vessels with a capacity of 7,332 tons. The number of missing and foundered grain-laden vessels in 1879-80 was exactly equal to the average for the three preceding years, but it is to be hoped that a diminution in the number of losses of grain-laden vessels will reward the vigilance which has been exercised in the past year.

LOSS OF LIFE.

The number of lives lost in British and Colonial vessels of all descriptions at home and abroad during the year 1879-80 was 2,155, including 299 passengers. Of these 2,155 lives, only 23 were lost on or near the coasts of the United Kingdom, as shown in the following table :—

LIVES LOST ON COASTS OF UNITED KINGDOM.

	Sailing.		Steam.		Total.	
	Vessels.	Lives Lost.	Vessels.	Lives Lost.	Vessels.	Lives Lost.
Belonging to United Kingdom	53	140	15	34	68	174
Colonies	4	9	—	—	4	9
Foreign Countries	9	48	—	—	9	48
Total for 1879-80	66	197	15	34	81	231
„ „ 1878-9	105	377	13	113	118	490
„ „ 1877-8	111	802	15	90	126	892
„ „ 1876-7	117	680	15	96	132	776

Of the 231 lives lost on the coasts of the United Kingdom, 80 were lost in 20 vessels that stranded, 62 were lost from 26 vessels in collision, 32 from 23 vessels which met with various casualties, 40 were lost in 7 vessels which were missing on coasting voyages, and 17 were lost in 5 vessels which foundered. The following table will show that the loss of life on the coasts of the United Kingdom during the year 1879-80 was less than $\frac{1}{3}$ of the average for the preceding 3 years. The only correct inference to be drawn from this satisfactory fact is that the weather during the winter of 1879-80 was exceptionally mild, and any hope of favourable continuity is shattered by the fact that three storms have taken place in the past winter, each of which has yielded a larger harvest of death on our coasts than was gathered in the whole twelve months ending June, 1880.

The number of lives lost in British vessels abroad was 1,972, of which 99 were lost on the coasts of British possessions, 111 were lost on the coasts of foreign countries, and 1,762 were lost at sea. Of these 1,972 lives 334 were lost in vessels which foundered, 171 in vessels which stranded, 43 were lost from 11 vessels which

re in collision, 119 were lost from 64 vessels which met with various casualties, and 1,813 disappeared with 68 vessels which were missing. The latter number is swelled by the 281 lives lost in *M.S. Atalanta*, which, as before pointed out, is included in the wreck Abstract to the utter confusion of the statistics.

Eight lives were lost from foreign vessels on the coasts of British possessions abroad.

The following tables will show the casualties at home and abroad, by which lives were lost and the trades in which the fatal casualties occurred, distinguishing British from Colonial vessels.

LIVES LOST IN BRITISH VESSELS AT HOME AND ABROAD.

		British Vessel of all description, registered or not.				Coasting. Oversea. Fishing. Total.		
Foundering	{ Vessels	...	...	...	9	20	1	30
	{ Lives	...	...	...	93	248	2	343
Strandings	{ Vessels	...	...	...	20	29	2	51
	{ Lives	...	...	...	57	160	5	222
Collisions	{ Vessels	...	...	...	12	11	11	34
	{ Lives	...	...	...	17	41	32	90
Other Causes	{ Vessels	...	...	...	16	64	5	85
	{ Lives	...	...	...	21	120	6	147
Missing Vessels...	{ Vessels	...	...	...	9	60	6	75
	{ Lives	...	...	...	61	1,258	34	1,353
Totals	{ Vessels	...	...	...	66	184	25	275
	{ Lives	...	...	...	249	1,827	79	2,155

Otherwise :—

		Coasting. Oversea. Fishing. Total.			
Belonging to United Kingdom	{ Vessels	45	148	24	217
	{ Lives Lost	180	1,643	73	1,896
Colonies	{ Vessels	21	36	1	58
	{ Lives Lost	69	184	6	259
Totals	{ Vessels	66	184	25	275
	{ Lives Lost	249	1,827	79	2,155

Space will not permit us to reproduce the tables for previous years, but any reader who desires to make a comparison should refer to the pages of this Magazine for June, 1880, and July, 1879.

LIVES SAVED.

It is refreshing after the foregoing analysis of disaster and death to turn to the records of lives saved from shipwreck. Besides the lives lost at home and abroad, there were 2,923 persons

endangered on the coasts of the United Kingdom, and 8,2 persons endangered at sea and abroad, making a total of 11,2 persons whose lives were more or less imperilled. The major of these persons were saved by their own boats, and by passenger ships, but as usual the rocket apparatus belonging to the Board of Trade and the numerous lifeboats on the coasts rendered good service.

The number of lives saved by the rocket apparatus during the year was 162, being less than in any year since 1858; but it should be remembered that the loss of life was less, and that not so many occasions for its use arose during the exceptionally mild winter under notice. The saving of 162 lives from absolute certain death—for it must be remembered that the apparatus is seldom used where a boat could live, or where there is any other means of escape—but if any further proof of the efficiency of the apparatus were needed, it would be found in the memorable services rendered in the great gales of October and January last, when 264 and 189 lives were saved by the apparatus alone. We are glad to observe that foreign countries are following the example of England in placing the rocket apparatus on their coasts, and that 1,152 lives have been saved during the past four years from British ships by the apparatus and by lines from shore. Many lives have also been saved at home and abroad by lifeboats, but we regret to observe that several fatal casualties have occurred with the boats of the well-supported Royal National Lifeboat Institution.

THE ROYAL OBSERVATORY, GREENWICH.



THE Board of Visitors of the Royal Observatory, Greenwich, held their annual meeting at the Observatory, on Saturday, June 4th, and Sir George B. Airy, the Astronomer Royal, presented his Report as usual. The attendance of Astronomers was much larger than on previous occasions, as it was generally understood

that it would be the last time on which the Astronomer Royal could be seen at the official post which he has so worthily and efficiently filled for a period of nearly forty-six years, and that the present Report would be his last. We give so much of it as is especially interesting to our nautical readers.

Photographs of the sun were taken on 149 days, and out of these on only eight days was the disc free from spots, whilst in the preceding year there was a complete absence of spots on sixty-four days out of 145 on which it was observed.

The magnetical and meteorological observations have been continued as in previous years. The mean temperature of the year 1880 was $49^{\circ}4$, which is $0^{\circ}1$ above the average of the preceding thirty-nine years. In that year the highest temperature was $87^{\circ}5$, on May 26th, and the lowest $17^{\circ}2$, on January 27th. The mean temperature was below the average, $5^{\circ}3$ in January, and 4° in October; and above the average, $2^{\circ}4$ in February, $2^{\circ}7$ in March, $2^{\circ}6$ in September, and $3^{\circ}4$ in December; in other months it differed little from the average. But in January of the present year (1881) a minimum was reached of $12^{\circ}7$; the mean temperature of the period, January 12 to 26, was only $24^{\circ}2$, or $14^{\circ}7$ below the average; the temperature fell below 20° on ten days, and rose above the freezing point only on three days. The severe snowstorm, with strong easterly gale, of January 18th, will not easily be forgotten.

The number of hours of sunshine registered in 1880 was 1,214, which is about the same as the average of the four years for which we have a record.

The following are the principal results for magnetic elements in the year 1880:—

Approximate mean westerly de-

clination $18^{\circ} 32'$

Mean horizontal force...	...	...	{	3.912 (in English units).
				1.804 (in metric units).
Mean dip	...	...	{	$67^{\circ} 34' 55''$ (by 9-inch needles).
				$67^{\circ} 35' 53''$ (by 6-inch needles).
				$67^{\circ} 36' 3''$ (by 3-inch needles).

The Report states that—"In respect of diurnal inequalities of

magnetic horizontal force and its direction, though all measurements are ready, the curves are not yet actually formed. In the last report I adverted to the usual character of these curves. Assuming it to be certain that they originate from the sun's power, not immediately, but mediately through his action on the earth, it appears to me (as I suggested long ago) that they are the effects of the attraction of the red end or north end of the needle by the heated portions of our globe, especially by the heated sea, whose effect appears to predominate greatly over that of the land. I do not say that everything is thus made perfectly clear, but I think that the leading phenomena may be thus explained. And this is almost necessarily the way of beginning a science."

"The discussion of the electrometer results for the year 1879 shows that the potential of the atmosphere is usually positive; that it is least in summer and greatest in winter, and especially in the colder weather of winter. There is also a definite diurnal inequality, having double maxima and minima, the maxima, on the average of the year, occurring at about 8h. a.m. and p.m. and the minima at about 3h. a.m. and p.m. In character the diurnal curve has a resemblance to the barometric curve, but the points of maxima and minima precede those of the barometric curve by about two hours. On days of magnetic disturbance, when aurora is visible, nothing unusual is remarked in the electrometer indications. Excepting thunderstorms, the greatest disturbances are experienced in showery weather, and are probably local disturbances only."

In reference to *time-work* the Report gives the following information:—

"In the first few years after the strict and systematic examination of competitive chronometers, beginning with 1856, the accuracy of chronometers was greatly increased. For many years past it has been nearly stationary. I interpret this as showing that the effects of bad workmanship are almost eliminated, and that future improvement must be sought in change of some points of construction. One which occurs to me (I mention it principally as a specimen of departure from customary forms) is this:—The

impact of the escape-wheel upon the pallet of the balance-axis takes place very near to that axis, and must produce considerable friction, though of short duration. I proposed to the late Mr. Charles Frodsham to meet this by use of a broader pallet and a lighter impact of longer duration. The decease of that accomplished horologist prevented the completion of the trials which he had commenced for carrying out my suggestion. Other variations of the established form might be worthy of trial.

"The Greenwich time-ball has been regularly dropped automatically at 1h. on every day throughout the year, with the exception of 6 days when the violence of the wind made it imprudent to raise the ball, and 8 days when the severe frost of last winter prevented its being raised; and of one day when there was accidental failure.

"The Deal ball was not raised (on account of high wind) on 10 days. It was not dropped (through failure in the telegraphic connection) on 7 days, and was erroneously dropped about 5s. too soon by telegraph signals on one day; and on another day it was not dropped at 1h. owing to telegraph signals continuing up to 1h.; on one day the current was too weak to release the trigger. On every other day the ball has been dropped automatically at 1h.

"The distribution of time-signals to all parts of the country continues to be made on the same system as in late years, by means of the chronopher at the central office of the Post Office telegraphs. In connection with this system, I would express the hope that the proposal to establish an hourly signal at the Start Point will be borne in mind.

"Last autumn a telegraphic determination of the longitude of Leiden was made with great care by M. M. Bakhuyzen. The interchange of signals between Greenwich and Leiden occupied nearly four months. I may here remark that the American extension of longitude carried out under Commander Green, U.S.N., to which reference was made in the last report, will be most useful for the transit of Venus in 1822. Cannot a British officer be found to complete the operations for Australia and New Zealand? I lament that this has not been done. Mr. Gill has undertaken the necessary work for the Cape."

The following general remarks which conclude the report are important and especially interesting :—

“The present meeting may afford a fitting opportunity for the expression of my views on the general objects of the Observatory, and on the duties which they impose on all who are actively concerned in its conduct. Assuming as beyond dispute that these ought to be carried out in a spirit liberal in itself and honourable to the nation, I proceed to state my opinion on the line of action which they suggest.

“The object prescribed to the Observatory is the promotion of ‘Astronomy and Navigation.’ And, since the abolition of the Board of Longitude, the second of these objects (which historically gave rise to the introduction of the first) presses upon the directors of the Observatory much more strongly than before. Considering then the claims of astronomy as bearing on navigation and our responsibilities in reference to them, we find that those responsibilities are by no means narrow. Whatever the rest of the scientific world may do or may not do, we are responsible for determinations of the fundamental elements of sidereal, solar, and especially lunar astronomy, with the highest accuracy that modern skill can secure. The same apparatus of instruments and of mathematical treatment which fix the places of fundamental stars will apply to those of other stars; the same which apply to the sun will apply to planets and comets (not unconnected with solar theory, by virtue of perturbation) and even to satellites. And we could hardly consider ourselves as discharging our duty to the more educated portion of the nation, or as maintaining our proper position in the world, if we did not include in our operations these latter off-shoots of the first-mentioned objects.

“But new astronomical subjects have arisen of which no one dreamed when our constitution was first fixed. The first of these was the measures of double stars. But this, though important as ever, has almost disappeared from our view when occupied with solar and spectroscopic physics. I yield to no one in the interest which I take in these subjects, and in the admiration with which I regard the positive conclusions and the problematic suggestions

ch are founded on them. But I still point out that these are parts of our original system, and their connection with the Greenwich Observatory is at any time liable to question.

I now advert to the general subject of navigation. And first I mark that magnetism, in its ordinary and nautical form, is sputably a proper subject for the Observatory. But within the present century there have arisen:—the accurate examination of magnetic irregularities, the partial reduction of daily irregularities to practical laws (still wanting theoretical explanation), and the establishment of the simultaneous co-existence of occasional disturbances covering the whole surface of the earth. Connected with these is the observation of magnetic currents through the terrestrial soil, registered at Greenwich for many years past, and attracting attention on the Continent. Perhaps no branch of science bears the same prospective importance as these. Yet I receive that their continued study in this Observatory requires special authorisation.

The original views in making astronomy contributory to navigation were limited to observations of the moon. But in the latter part of the last century the possibility of making chronometers subservient to the determination of longitude (a subject to which the late Board of Longitude gave good attention, to which the Government has always offered liberal rewards) was proved, and in the present century the improvement has been very great. This has been effected by our Hydrographical Office (mainly through the action of the Observatory), partly by pecuniary rewards, partly by careful attention to the accuracy of every chronometer purchased. And the practical value of the chronometric system has been very greatly increased by taking advantage of the galvanic distribution of time currents, and by the galvanic exhibition of ball-drops and other signals. There can be no doubt that all the agencies involved in this system are well employed, and that they are a legitimate part of the Observatory as originally contemplated.

“Still I remark that the Observatory operations bearing on chronometric navigation are not carried out to the extent which I should desire. It is known to all persons familiar with chronometers

that rates of the chronometers, obtained while the ships are actually in voyage, would possess remarkable value. We possess the power of giving facility for obtaining these to a large part of our mercantile Navy, by exhibiting a time-signal at every hour at Deal (where the necessary apparatus already exists) and on the Start Point. I have several times brought this proposal, as regards the Start, before the Government, but unsuccessfully. But I should have done wrong, if I had omitted, in this general survey of the duties of the Observatory, to state my continued conviction that this is a proper and very desirable addition to the other points of assistance which we can give to navigation.

"Next—closely connected however with the subject of navigation—is the knowledge of the longitudes of distant ports, as referred to the Greenwich Observatory. And I approach this subject with grief. We have entirely abandoned the longitudes of the Atlantic, which have been cleared away, before our eyes by the scientific enterprise of another nation. The Pacific, bearing those vast and important colonies, almost entirely British, is equally neglected; though so much is ready that the mission of a single officer would quickly establish all. The same aspiration which has mastered the Atlantic is now bent (as I understand) on adding to its scientific dominion the Pacific. I think this is not honourable to our nation.

"There remains another subject, which occupies no small part of the force of the Observatory, and which I am unable to connect with either of the two great divisions to which I have alluded—the subject of meteorology. It is exceedingly popular in the country, perhaps because it requires little of expense or of science. It is also pursued at many foreign observatories, where vast numbers of observations are produced without attempt at classification or reduction. We at least are not amenable to the accusation, and may appeal to our reduction of more than twenty years' collected observations as giving matter of permanent interest to the more scientific meteorologist, and even to the geologist. Still I call attention to the fact that this is a subject which though introduced mainly by myself, I regard as foreign to the original 'Astronomy and Navigation' of the Observatory."

At the conclusion of the Report an appropriate add made to the Astronomer Royal by the Board of Visitors i to his intention of relinquishing his official duties ; and it hoped that he may long enjoy that repose which he ha earned, but which would seem to be likely for a time to partial, since he is desirous of devoting his energies to important researches on which he has lately been engag George B. Airy's tenure of office has exceeded in length any of his predecessors excepting Dr. Maskelyne.

THE LAW OF DAMAGES CAUSED BY COLLISION AT SEA.

By F. W. RAIKES, M.A., L.L.M., OF THE INNER
BARRISTER-AT-LAW.

INTRODUCTORY.

THE intention of this Thesis is to discuss the law at present existing, on the subject of the liability for damages in actions arising out of collisions at sea, more especially in their International Bearing.

Until a very recent date the Law administered by the Common Law in this country recognised but one principle although sometimes permitting a loss to one of two guilty parties out of proportion to the measure of his guilt, never could burden of damages on anyone disproportioned to his innocence.

That principle engrained in our law and handed down to us from that great fountain of jurisprudence, the Civil Law of Rome, is variously expressed in maxims familiar to the ears of all, which may be cited, "*Sic utere tuo ut alienum non laedas*," "*Exedit rei-publicæ ne suâ re quis male utatur*," "*Quod commodum capere potest de injuriâ sua propria*," "*Nullus in alterius damnum legem committit*," "*Nemo in alterius advantage de son tort demesne*."

"He who seeks equity must do equity."

"You must come into Court with clean hands."

Such then was the law administered, that if a plaintiff sought damages for the injury done to him, and it appeared that he contributed by his own act to that injury, he could recover nothing. We shall presently see how far this agrees with the law in other countries.

At the same time, another law was administered by certain Courts within the realm in which this principle was so far from being recognised, that a plaintiff might come into Court openly alleging that damage would not have been caused but for his own negligence, yet by proving that the defendant had in some measure contributed to it, he could recover half the damages which he had sustained from the joint act of himself and the comparatively innocent party.

This principle, if it can be justly so called, of Law, administered by Courts of Admiralty, was never held to be more than a mere compromise, a "*Judicium Rusticorum*," and cannot on this ground be entitled to much weight; but I venture further to think that its application to cases of collision in which both vessels are to blame is not justified by the practice of the Maritime States of antiquity, or of the middle ages, but that it was confined in them to those cases in which the cause of the collision and of the damage arising therefrom was obscure, and therefore to be treated rather as a common misfortune than as a mutual fault.

Whilst, however, the Statutes 13 Ric. II., Stat. I., Chap. V. "*What things the Admiral and his Deputy shall meddle*;"* 15 Ric. II., Chap. III. "*In what places the Admiral's jurisdiction doth lie*;"†

* "Forasmuch as a great and common clamour and complaint hath been oftentimes made before this time, and yet is, for that the admirals and their deputies hold their sessions within divers places of this realm, as well within franchise as without, accroaching to them greater authority than belongeth to their office, in prejudice of our Lord the King, and the Common Law of the realm, and in diminishing of divers franchises, and in destruction and impoverishing of the common people; it is accorded and assented, that the admirals and their deputies shall not meddle from henceforth of any thing done within the realm, but only of a thing done upon the sea, as it hath been used in the time of the noble prince King Edward, grandfather of our Lord the King that now is."

† "At the great and grievous complaint of all the Commons made to our Lord the King in this present Parliament, for that the admirals and their

2 Hen. IV., Chap. II., A.D. 1401 "*For Confirming and Amending 13 Rich. II., Stat. I., Ch. V., respecting the Jurisdiction of the Admiral,*" were in force and any encroachment of the Admiralty was promptly prohibited (see Coke, 4th Inst.) and therefore the jurisdiction of that Court was strictly confined to causes of damage arising on the High Seas, whilst that of the Common Law Courts, though not confined to causes arising within the body of a county, was yet practically limited to them;—The greater facilities given by the Admiralty Court by the arrest of the defendant's property (the ship), pending the trial, and the subsequent sale of it to satisfy a judgment recovered, inducing plaintiffs in all cases where it had jurisdiction to resort to it;—These two practices, as to the incidence of damages in cases of contributory negligence, might well exist together, and seldom or never clash. The practical inconvenience being slight and the causes few, whatever might be the measure of justice to individuals.

deputies do encroach to them divers jurisdictions, franchises, and many other profits pertaining to our Lord the King, and to other Lords, Cities, and Boroughs, other than they were wont, or ought to have of right, to the great oppression and impoverishment of all the Commons of the land, and hindrance and loss of the King's profits, and of many other Lords, Cities, and Boroughs through the realm; it is declared, ordained, and established, that of all manner of contracts, pleas, and quarrels, and of all other things done, or rising within the bodies of counties, as well by land as by water, and also of wreck of the sea, the Admiral's Court shall have no manner of cognizance, power, nor jurisdiction; but all such manner of contracts, pleas, and quarrels, and all other things rising within the bodies of counties, as well by land as by water, as afore, and also wreck of the sea, shall be tried, determined, discussed and remedied by the laws of the land, and not before nor by the admiral, nor his lieutenant in anywise, nevertheless, of the death of a man, and of a maihem done in great ships, being and hovering in the main stream of great rivers, only beneath the bridges of the same rivers nigh to the sea, and in none other places of the same rivers, the admiral shall have cognizance, and also to arrest ships in the great flotes for the great voyages of the King and of the realm; saving always to the King all manner of forfeitures and profits thereof coming; and he shall have also jurisdiction upon the said flotes during the said voyages only; saving always to the Lords, Cities, and Boroughs, their liberties and franchises."

When, however, the Legislature extended the jurisdiction of the Court, and enacted

(3 & 4 Vict., C. 65, Sec. 6)

"That the High Court of Admiralty shall have jurisdiction to decide all claims and demands whatsoever, for . . . damage received by any ship or seagoing vessel . . . and to enforce the payment thereof whether such ship or vessel may have been within the body of a County upon the High Seas, at the time when the . . . damage was received . . . in respect of which such claim is made."

And again by

(24 Vict., C. 10, Sec. 7)

"That the High Court of Admiralty shall have jurisdiction over any claim for damage done by any ship."

The anomaly of having two laws so widely different in cases precisely similar and possibly even identical, both administered under the roof of Westminster Hall, became so glaring that it was obvious to all interested in the matter, that whenever law reform was earnestly taken in hand it must be remedied.

Accordingly, when the Judicature Act was introduced in 1873 it was proposed by the Lord Chancellor (Lord Selborne), that the rule of Common Law, where it was shown that the plaintiff contributed to the injury, should in all cases prevail.

In stating the Law of the Admiralty Court, the Lord Chancellor is reported to have used the following expressions:—

(*Hansard Parl. Deb., 3rd Series, Vol. CCXIV., p. 340, Feb. 1 1873.*)

"In respect of collisions at sea it is proposed to adopt, instead of a rule which now holds good in the Court of Admiralty, the rule of Common Law as to contributory fault or contributory negligence. The rule of law is that if the plaintiff is equally in the wrong he cannot recover from the defendant, and if the defendant is equally in the wrong he cannot recover from the plaintiff. But what the Court of Admiralty does is this:—If two ships run into each other and both go to the bottom, as I understand the practice, the Court of Admiralty adds the value of both ships and then divides the total between the two parties; so that if I were the owner of a ship worth only £10,000, and one of your lordships was the owner of one worth £50,000, you see how ill I should fare in comparison with the owner of a better ship if both vessels went down after a collision."

This proposed alteration in the law, called forth a letter from Mr. H. C. Rothery, who at that time occupied the post of Registrar of the Admiralty Court, a copy of which is preserved in the library of the Inner Temple (Tracts Law, etc., Vol. XXVII., I. H. 27), in which with the learning both general and special that was to be expected from such a source, and with the perspicuity which all who have had the pleasure of practising before him recognize, he most ably defended the rule as it stood in the Admiralty Court; and on the proposed alteration being discussed in Committee in the House of Commons it was, as will be seen from the following report of the debate, exactly reversed:—

(*Hansard Parl. Deb.*, 3rd Series, Vol. CCXVI., pp. 1800, 1801, July 4, 1873.)

"Mr. Gregory proposed as an amendment in page 16, line 22, to leave out 'Courts of Common Law' and insert 'Court of Admiralty;' and in line 23 to leave out 'High Court of Admiralty' and insert 'Court of Common Law.' He thought the rule of the Admiralty should prevail especially as the same was the rule in all foreign Courts.

"Mr. Vernon Harcourt supported the amendment, as they ought, he thought, to guard against a conflict of law in respect to international matters.

"Dr. Ball thought that neither rule ought to be retained, but that the Judge ought to be vested with a discretionary power to apportion the damage between them. He however preferred the Admiralty to the Common Law rule, and as it had been adopted by other countries, a power should be given to the Court to enforce it.

"Mr. James said he would vote for the amendment, on the ground that it was desirable to maintain a rule of law which was well known to other countries.

"Mr. Watkin Williams opposed the amendment, as he preferred the Common Law rule to the proposed alteration.

"Mr. Gordon explained that the Scotch Courts acted on the Admiralty rule.

"The Attorney-General said he had been all along in favour of the Admiralty rule, but had yielded to the Lord Chancellor on the point. His own private opinion had always been in favour of the Admiralty rule; and as every member of the legal profession who had spoken, with the exception of the hon. and learned member for Denbigh (Mr. Watkin Williams,) had also expressed themselves in favour of it, he could not but assent to the amendment of the hon. gentleman, the member for East Sussex.

"Amendment agreed to."

The result of which was that the clause, so far as it relates to the matter here discussed, stands as follows :—

S. C. J. Act, 1873 (36 & 37 Vict., Chap. 66).

“ *Sec. 25. Rules of Law upon certain points—*

“ And whereas it is expedient to take occasion of the union of the several Courts whose jurisdiction is hereby transferred to the said High Court of Justice, to amend and declare the law to be hereafter administered in England as to the matters next hereinafter mentioned :

“ Be it enacted as follows :—

“ (9.) *Damages by collision at sea—*

“ In any cause or proceeding for damages arising out of a collision between two ships, if both ships shall be found to have been in fault, the rules hitherto in force in the Court of Admiralty, so far as they have been at variance with the rules in force in the Courts of Common Law shall prevail.”

It will be observed that in the discussion which preceded the alteration, it was assumed that the Admiralty rule was that which had held good in other countries, and for that reason and apparently for other, the alteration was made. In the letter before referred to, in addition to this primary and main reason, other reasons were assigned, which no doubt from the wide circulation the letter received, had their weight in influencing the minds of the Committee. Those reasons briefly stated were, that the Admiralty rule had from time immemorial been the law of the sea ; that the Admiralty rule was a nearer approach to perfect equity than that of the Common Law and the practical argument that if the Common Law rule was adopted it would tend, if not actually to increase the number of collisions, yet certainly to magnify their results.

If any one of these four propositions be proved, no doubt there would be strong reason for upholding and establishing the Admiralty rule, and *à fortiori* if more than one can be so proved. I propose now to discuss each of them.

(I.) *As to the Claim of the Admiralty Rule to Antiquity.*—I think I am correct in affirming that the earliest statement as to the law in cases of collisions between ships is that contained in the Digest, though in case of a collision between beasts the Mosaic law dis-

in one case, lay down a principle very similar to that reprobated by the Lord Chancellor (Exodus, Ch. XXI.) :—

V. 35. "And if one man's ox hurts another's that he die; then shall they sell the live ox, and divide the money of it; and the dead ox also shall they divide.

V. 36. "Or if it be known that the ox hath used to push in time past, and his owner hath not kept him in; he shall surely pay ox for ox, and the dead shall be his own."

The qualification of the rule of equal division of v. 35, given in v. 36, where there is a *scienter* on the part of the owner of the ox doing the damage, and consequently negligence in letting such a beast be at large, shows, I think, that v. 35 only applies to cases where there is no evidence to show who is to blame, not to those where there is negligence or fault on both sides. This, at all events, was apparently the application of the principle made by Solomon (I. Kings III., v. 16—28), with such eminently satisfactory results.

To return to the extract from the Digest referred to above.

Digest IX., Tit. II., Ad. Legem Aquiliam. Fr. 29.

(Pardessus Vol. I., p. 94).

Sec. 2. "Si navis tua impacta in meam scapham damnum mihi dedit, quaesitum est quæ actio mihi competeret. Et ait Proculus, si in potestate nautarum fuit, ne id accideret, et culpa eorum factum sit, lege Aquiliâ cum nautis agendum; quia parvi refert, navem immittendo, aut servaculum (sermulum) ad navem ducendo, an tuâ manu dederis, quia omnibus his modis per te damno adficior; sed, si fane rupto, aut, cum a nullo regeretur navis incurrisset, cum domine agendum non esse.

Sec. 4. "Si navis alteram contra se venientem obruisset, aut in gubernatorem, aut in ducatorem, actionem competere damni injuriæ, Alfenus ait Sed, si tanta vis navi facta sit, quæ temperari non potuit, nullam in dominum dandam actionem: sin autem culpâ nautarum id factum sit, puto Aquiliæ sufficere."

Which I think may be paraphrased as follows :—

Sec. 2. "If your vessel fouling my boat, damages it, the question arises what is the nature of my action against you? Proculus is of opinion that if the sailors could have avoided the accident, and that it happened by their default, that an action under the Aquilian Law lies against the sailors, because it is immaterial, whether you do the damage by the impact of the ship itself, or by a steer-oar drawn after the ship, or with your own hands, as in each case, I suffer damage by your act. But if the other vessel

fouls yours because she has broken adrift from her moorings or when she is out of command, you have no action against the owner."

Sec. 4. "If one vessel should run down another coming towards it, an action for the injury sustained lies against either the master or helmsman, so says Alfennus, but if the ship had so much way on that it was not possible to avoid the collision, no action lies against the owner, but if it has been caused by the default of the crew, I consider that an action under the Aquilian Law is the proper remedy."

That is, that if the accident is an inevitable one there is no remedy but if otherwise the ordinary Aquilian Law applies.

The Law of the Eastern Empire—(Pardessus, p. 186, Vol. I.) runs in nearly the same words as Section 2 above with the addition that "if one ship sinks another the captain or look-out man or the rest of the crew are liable for negligence unless it was blowing very hard."

There is no suggestion of dividing the damages. It is merely if there is negligence the negligent party must make good the damage; if the accident is inevitable, each must abide their own loss. There are, it is true, in this and the preceding chapter penal provisions by which, in certain cases, the defendant has to pay double but never anything about half. The same law is laid down in almost the same words in further fragments of the law of the Eastern Empire. (Pardessus, p. 194-198, sec. xxvii., p. 205, Tit. xi.)

In the so-called Rhodian Law, which, if not that actually in force in ancient Rhodes, is no doubt of great antiquity, and of which there is a copy and French translation given in Pardessus (Vol. I., p. 253), and an English Translation in the "Dominion of the Sea" (p. 107), the law is thus stated:—

Art. 36; *Of ships running aboard of one another*—

"If any ship under sail in the day-time run aboard of another lying at anchor in a harbour, or that has slackened her sails, all the loss and damage shall fall upon the master and passengers and goods of the ship under sail, which shall be liable to a contribution.

"If it be in the night-time, the ship that slackens her sails shall put out a light, or, wanting that, shall endeavour to avoid the danger by shouting and crying; both which being neglected and the ship perish, 'tis her own fault; and that being duly proved, no reparation shall be made by the other.

"But if those who have the management of the sails be negligent, and the Commander of the Watch be asleep, the ship which has its sails spread, shall be deemed to be the author of that misfortune and shall refund the damage done to the ship she runs aboard of."

Putting aside for the present the liability of passengers and goods to contribute, this it will be seen is only the ordinary Common Law rule. In the day-time it is considered that the ship at anchor and therefore inert but visible cannot be to blame and therefore the ship under weigh has to pay. At night-time, however, the fact of the ship at anchor not taking proper precautions to make her presence known constitutes such negligence on her part that, causing or contributing to the accident, she cannot recover. But again, if the management of the ship under weigh is careless or *à fortiori* the person in charge asleep, so that he could not see the lights if exhibited, or hear the shouting, then, as the absence of such signals could not have caused the damage nor their presence prevented it, the negligence did not contribute to the accident and the ship under way must pay all, as would be the case at Common Law ("Mayne on Damages," 2 Ed., pp. 36, 37), and even by that of the Admiralty ("The Englishman," 3 P.D. 18). There is, therefore, nothing whatever herein to show that in any case there was to be a division of damages but the absence of any special provisions on the subject, and the clear statement of the rule of Common Law is strong evidence that no such principle existed.

To turn now to that great English authority, which is accepted as declaring the Common Law of the Sea, "The Blacke Booke of the Admiralty," we find in Art. XX. of the "Instructions to the Admiral," as given by Sir Travers Twiss, p. 36, and which probably date between 1337 and 1351 (see Introduction, p. xxx.)

"Item, que nulle nef ne vessel de la flotte pour orgueil ne pour hayne ou enuye sur la mer ou entrants es ports ou en port ottoire veille au dommage dautre nef ou vessel de la flotte ou pris par ceux de la flote, sur paine de faire *plaine amende* de ce qui est endommage en son deffault. Et qui endommage et debryse autres entrants aux ports ou dedens ports ou sur la mer nenvoillantz par cause de tempeste ou autrement, il paiera et amendera la moitie du lommage a la discrecion et jugement de l'admiral."

Here there is a provision that in case of a common disaster without blame to either party each should pay half the damage but for the provision to be in force it is a *sine qua non*, not only that there should be no contributory negligence but that there should be no negligence at all; it mitigates the losses of an innocent person, but does not absolve the guilty. Passing on to the Laws of Oleron, a code dating at least from A.D. 1266 (vide *Dominion of the Sea*, 173, *Selden Mare Clausum*, Lib.II., ch. 24), as contained in the Black Book, we find, following the paraphrase given by S. Travers Twiss, and which he states (p. 89) to be taken from the "Rutter of the See," which purports to be "translated out of Freneche into Englysshe, and to be imprinted at London, in Poull Chyrche yerde at the sygne of the Mayden's heed by me Thomas Petry The yere of our Lord God MDXXXVI. The xviii. daye of Marche

Art. 15. "It may so be that as a shyp lyeth ankere at rode another shyp cometh out of the see and by my guydyngge hytteth agaynst the shyp that is in the way so that the shyp is domaged with the stroke that the other shyp gave it, and there is wyne shedde on both partes. The losse ought to be praysed and devyded half to half, betwene the shyppes and the wyne lost in the sayd shyppes also among the marchauntes, and the mayster of the shyp that hyt the other must swere on a boke, and hys marchauntes with hym that he dyd it not with his will. The reason why this jugement was made is, that an olde ship wyllyngly lyeth not in the waye of a better so fer forth as it knoweth not to damage it by grevyng, but whan it knoweth wel that it must part by halfe it wyl passe by out of the way. Suche is the jugement."

Here, again, it is a *sine qua non* that there should be no fault on the part of the running down ship, that fact being established the collision is treated as a common disaster to both ships, and by an extension of the principles of average contribution, each ship and cargo is to pay a proportional part of half the joint loss instead of a similar proportional part of the whole of the individual loss. The fact of the cargo contributing when no fault can possibly attach to the owner of it appears to me altogether to remove the possibility that this article could have been intended to apply to cases where those in charge of both ships were to blame. I

ought, however, in justice to be noticed that in another translation of the Rules of Oleron given in "The Dominion of the Seas and Body of Sea Laws," published in the reign of Queen Anne, in which this article appears at p. 141 as Article XIV., there is no mention made of the cargo contributing, but the note of the author does not contemplate that the rule applied where both vessels were to blame, but rather was framed to prevent an owner of an old and worthless vessel which was sunk in such a collision from obtaining the *full price* of a new ship from the wrongdoer in the absence of any evidence except his own as to the real value of the lost ship. It was in fact rather a limitation of the wrongdoer's liability than a division of damages between two wrongdoers.

The other most important code of Maritime Laws in use amongst the nations of Northern Europe was that of the Laws of Wisby, probably a code nearly contemporaneous with the Laws of Oleron, as Wisby was destroyed as a centre of commerce in 1361.

Arts. L. and LXX. of that Code, as translated in the "Dominion of the Sea" (pp. 186, 190), are as follows:—

L. "If two ships strike against one another and receive damage the loss shall be borne equally between them, unless the men aboard one of 'em did it on purpose; in which case that ship shall pay all the damage."

LXX. "If a ship under sail does damage to another, the master and mariners of the ship doing the damage must swear they did not do it designedly and *could not help it*, and then the damage shall be borne by both ships in equal proportion; and if they refuse to swear the damage shall be paid by the ship that did it."

Though it may be thought that it is not a very satisfactory way of arriving at the truth, to take only the evidence of those incriminated, yet reading these two articles together it appears here again that in case only of inevitable accident or inscrutable cause are the damages to be divided; if the people on board one ship could not swear that they could not help it they had to pay and clearly could not recover anything themselves, and therefore if neither could take such an oath neither could recover anything.

Passing from these, the most prominent and most ancient codes of Maritime Law in use amongst the nations of Northern Europe, to

the "Consolato del Mare," which ruled the navigation of the Mediterranean, we find the following passage, which is cited in the letter before mentioned from Pardessus' Translation. (Vol. II., p. 177.)

Cap. 157. "Lorsqu'un navire est le premier ancré quelque part celui qui viendra ou entrera apres doit s'ancrer de maniere à ne lui causer aucun dommage; s'il lui en cause, il est obligé de l'indemniser selon ce qui est contenu éclairci et certifié dans le chapitre ci-dessus. Mais il faut entendre que le navire ancré le premier ne change point les ancres ni les câbles qu'il avoit, dedans ou dehors, depuis que le navire entré après lui se sera ancré. S'il les déplace ou les change après que le dernier navire sera ancré et que le premier reçoive quelque dommage, le navire entré après lui ne doit pas l'indemniser en totalité mais seulement en partie, (*mas de partida*) parce que le premier navire a changé ses ancres et ses câbles dedans et dehors.

Here, no doubt, there is a provision for mitigating under certain circumstances the liability of a wrongdoer for the damage done him. I think the passage may be paraphrased much as follows:—"When two vessels are anchored near one another, the last comer will be held liable for damages caused by his anchoring in such position as to give a foul berth to the first comer; but if after he has anchored the first vessel shifts her berth or veers cable, and after so doing receives damage, the last comer is not bound to make good the whole damage, but only (*partida*) her item of the account," and can only mean that if the last arrival gave a berth only slightly foul, *i.e.*, in which the damage inflicted would be trifling; but that the amount of damage was inflamed by the action of the other vessel, that other vessel could only recover the portion of the damage which she would in any case have suffered; For if the new comer had anchored in a place where she could not have damaged the first vessel at all she would clearly not be liable at all for the consequences of a subsequent movement on the part of the first vessel. If this be the correct interpretation of the law it is in accord with both The Civil and Common Law.

Of laws of secondary importance to those already cited it may suffice to notice The "Jugemens de Damme," which were no doubt of authority at a very early date in the Low Countries, and where we find the law stated almost in same terms as in the Rules of Oleron.

"Jugemens de Damme ou Lois de West Capelle" (Pardessus I., p. 379), and which may be translated as follows:—

(Art. 15.) "It happens that one ship is moored in port and another coming in with the tide fouds her, in such a way that the collision does damage and the casks of wine on board are bilged, the damages must be divided *by estimation* between the two ships, and the wines or goods which are in the two ships must bear the loss in common between them."

"The master of the ship which has done the damage, and his crew are bound to swear that it was not done voluntarily, and that he *could not avoid it*. In that case he is only bound to pay the *half* of the damage, and he will be no more liable, but if he and his crew can not take such an oath, he is bound to pay the whole damage. This is the law in such a case."

"The reason of this judgment is as follows:—

"It may chance that a person wilfully puts an old vessel in the way of sound ships if he knows that he will have the full value of a ship when it is crushed by the good ones, but when he knows that he only gets half the damage he willingly keeps out of the fair way."

See also Lois de Westcapelle, xvi., xvii. (Pardessus, I., 389, 390), where we find the same thing in different language.

Without going into further details of the Maritime Laws in force, subsequently to these leading authorities, it may suffice to say that in none of all those collected by Pardessus is the law of equal division of damages where both vessels are to blame laid down, most of them are merely transcripts or paraphrases of the three great authorities already cited, though one or two exceptions may be mentioned in passing.

The Maritime Law of Berghen, A.D. 1274, Chap. 17, 18 (Pardessus, Vol. iii., pp. 38, 39), prescribes specific pecuniary fines for collisions, the amount of the fine being graduated according to the part of the vessel which was damaged, and to be paid half by the master and half by the crew.

The ancient Maritime Law of Sweden, Tit. vii., Ch. ix. (Pardessus, Vol. iii., p. 129), and the Code Maritime of Charles XI., Anno 1667, Part v., Ch. viii., ix. (Pardessus, Vol. iii., pp. 173, 174). Whilst decreeing that as a rule in cases of inevitable accident, the

loss should be equally divided, make the special provision that a ship at anchor damaged by one under way where there is negligence shall receive one-third of her damage, and the vessel under way nothing, a somewhat similar provision is also found in the earlier Danish Law (A.D. 1508), Ch. ix., which decreed that when a vessel was injured by another accidentally it should recover one-third of her loss.

The latest authorities anterior to the 18th century on the subject are that of the Ordonnance of Louis XIV. in 1681, and the Danish Law of Christian V., 1683, the former is spoken of with high favour in the "Dominion of the sea and body of Sea Law" where the translation runs as follows:—

Sec. XXXII., Art. 10 (Valin Ord: de la Marine, Liv. I. Tit. vii., Des Avaries Art 10). "In case of ships running aboard of one another, the damage shall be equally sustained by those that have suffered and done it whether during the course, in a road or in a harbour."

Art. 11. "But if the damage be occasioned by either of the masters it shall be repaired by him."

In reference to which rules, all that can be said with certainty is that if one party is guilty of negligence he should of course bear the loss, and by inference that where neither is proved to be guilty of negligence (Valin Ord. de la Marine, Vol i., p. 323), it is considered as a pure accident and the damages are to be divided, not, I think, necessarily in moieties, but possibly in proportion to the values as in case of average contributions. Valin in commenting on the articles in question in 1776 (Ordonnance de la Marine, Vol. i. p. 178), says the doubt existed in his time though the general opinion was in favour of an equal division in such a case.

Of the Danish Law of 1683 I have obtained a translation from an old Book in the Library of the Inner Temple, published for the guidance of English Merchants in the Danish Settlements, in which avoiding certain archaic expressions is as follows:—

The Danish Laws of Christian V., 1683.

Book iv., Chap. iii., Art. 3. "If two ships so circumstanced in the course that they cannot avoid one another, happen to run foul, the captains shall share the damage equally, whether it happened by day

by night, having first taken their oaths and their sailors with them that it was *accidental*, and noways designed.

Art. 4. "If a vessel steering its course runs foul of or anyways damages another vessel in a port or harbour or lying at anchor or moored to the shore, the captain shall at his own expense make good all damages if his negligence or rashness was in fault, and if he is not responsible (*sic*, probably "sufficiently solvent" is a better rendering) his ship shall pay it, but not the cargo; and if he has received any damage he shall have no redress. But if he *could not avoid* running foul of or damaging the said ship, both of them shall join in making good the damage, according to the arbitration of men of probity.

Art. 5. "If by hard weather or any accident a ship is drove from her anchor or moorings, and runs foul of another at anchor, without any fault or negligence intervening, and both are damaged, the amount of the damage shall be estimated by experts, who shall examine carefully into and see the particulars, and determine what each ship shall contribute; but if the vessel which struck the other alone received damage, the vessel at anchor shall contribute nothing."

Art. 9. "All vessels lying at anchor in open waters, or sailing therein in dark nights towards the end of autumn, shall have lights. Small craft are however not obliged to this law."

Book iv., Chap. i., Art. 5, and Book iv., Chap. iv., Art. 24, Provide that a pilot shall make good any damage caused by him, but do not remove the liability of the ship.

Book iv., Chap. ii., Art. 5, Limits the liability of the owners for the captain's acts to the value of the ship.

I think that every code of Maritime Law has now been referred to which carries any weight, and that the only one which at all bears out the theory of a division of damages in cases of contributory negligence is the *Consolato del Mare*, and that even there the more probable meaning is that a wrongdoer was only to be held liable for the natural results of his wrong, and not for consequential damages occasioned by the improper conduct of the other party. With these observations I would leave the consideration of the law as it stood prior to the 18th century, and turn to the condition in which we find it in modern times, and especially at the period at which the Judicature Act made the alteration in the law administered in the Courts of Common Law in this country.

(To be continued.)

THE LOSS OF THE "BRISTOL CITY," S.S.

WE have received a copy of a pamphlet in reference to the enquiry in the above case, and having regard to the importance of the issues involved and the forcible manner in which the writer states his views, we think it right to submit the following extracts for the criticism of our readers,—especially as just now the maritime community appears to be much exercised concerning some of the decisions given at these Courts of Enquiry.

The pamphlet is published anonymously, but the author certainly evinces considerable practical knowledge of the points in question.—Ed. N. M.

"This vessel disappeared on a voyage from New York. The report of the enquiry held before a learned Judge and two Assessors tells us that 'The Court, having carefully inquired into the circumstances of the above-mentioned shipping casualty finds for the reasons annexed :—

"(1.) That there is nothing to show how the said vessel was lost

"(2.) That she may have been lost either by collision with some wreck or other ship, or

"(3.) By some other accident of the seas, or

"(4.) May have been overwhelmed with the heavy seas which she, no doubt, encountered on her voyage across the Atlantic.'

* * * * *

"The report is a model of conciseness and accuracy, and is the most complete admission that the Court had, and could have by means of knowing how, why, wherefore, where, or when the ship was lost. In fact, that the Court knew nothing about the loss, and they say so. To the report no one can take exception. It contains no speculation, but is, on the contrary, one of the most trustworthy, concise, and valuable of the many reports which have come under our notice.

* * * * *

"The Court having decided that there was no evidence whatever on which to come to any conclusion as to the cause of the loss, proceeds to deal with two most complicated questions, both of them outside this case altogether; both of them questions

on which the 'Annex' distinctly shows that the Counsel for the Board of Trade needed no remarks of any kind, nor any opinion from the Court. This particular ship does not happen to have been a 'well-decked' ship; but a flush-decked ship with three tiers of beams and two decks laid, having a short poop and fore-castle, and a midship-house over the engine-room with alleyways, so that when the doors were open the sea could run fore-and-aft.

"The owners of the *Bristol City*, like the owners of other similar ships, until the Assessors advised the Court otherwise in this case, were living in the simple and comforting belief that they were the happy possessors of specimens of what Mr. Martell calls 'the three-decked ship.' They however now learn, and probably the information surprises them as much as it does us, that their belief was a delusion, and that their ships are unfortunately not only 'well-decked ships,' but sad to relate *double well-decked ships*. The shipowner may, or may not be, under many obligations to the Court for this information; but perhaps the greatest obligation is this last one, of correcting the hazy ideas prevalent all over the world, and making it quite clear that 'the three-decked ship' of Mr. Martell, and of Lloyd's Register, is the 'double well-decked' ship of the Wreck Courts and their Assessors.

* * * * *

The writer, in the first place, asks "Whether the mistake made by the technical instructors or instructor of the Court, in this case of the loss of a three-decked ship of the Register Societies, is not the best and most important testimony that could have been given of the safety, not of the well-decked ship of the Court, but of the well-decked ship of fact and reality?"

He enquires, secondly, "How it came to pass that the Assessors allowed the Court to fall into the act of describing and enlarging on 'the three-decked ship' as a 'well-decked ship?' A Judge, relying solely on his Assessors in all technical matters, ought to be kept straight by them, otherwise he will become the victim of misplaced confidence.

"A third question is why the Assessors did not bestir themselves and put the matter right between the delivery of the oral

judgment and the writing and signing of the report? They might indeed have referred to Lloyd's Register Book in the meantime.

"A fourth question is, how does it come to pass that neither the representatives of the owner, nor of the builder, took the pains to put this point right? and if they did their best to establish the fact that this ship is not what everyone regards as a 'well-decked ship,' why in settling the report did the Assessors attach so little value to the case as not to bring this part of the evidence before the public in their report? At least it must have been a disputed point.

Finally, the author observes, "The Annex tells us as regards the *Bristol City* :—

"(a) That the 'two wells would if filled with water become source of very serious danger to the vessel.' * * *

"(b) 'That if these two wells had been covered over the vessel would have been much safer, and better able to withstand an Atlantic gale.' * * *

"(c) 'As the law stands at present, the owner could not cover them up without subjecting himself to a heavy fine on each voyage in the form of tonnage dues.'

"(d) 'An owner is prevented from making his vessel as safe as she could and ought to be made by the operation of the existing Tonnage Laws.'

"(e) 'If an owner were at liberty to cover these wells with a strong substantial deck without being subject to the payment of higher tonnage dues, there can be little doubt that he would do so at once.'

"(f) 'Not only would it facilitate the working of the ship,

"(g) 'But would prevent her being swamped by successive seas, as

"(h) 'These well-decked ships must frequently be when crossing the Atlantic during the winter months.'

"Messrs. Hill, of Cardiff and Bristol, are known wherever the Union Jack flies as merchant and shipping princes; and, taking the words of the report, they are, we fear, thereby placed in this very serious position. Ships like the *Bristol City* (the report tells us) are liable to be swamped by successive seas, whereas if converted into four-decked ships by a strong substantial deck the

conversion would prevent it; and yet in the face of that plain fact, and solely in order to save the paltry increased charge for tonnage dues which would necessarily be incurred by making the ship larger and a better carrier, and by making her safer for human life, they (these merchant princes) did not add the necessary deck. We do not believe such a conclusion. We do not believe that Messrs. Hill, out of consideration of the Tonnage Laws, deliberately make a ship not as safe as she can be made and ought to be made, or would for such a paltry consideration as increased dues on an increased size of ship leave any deck off a ship, or any covering off a ship, if they knew that by adding it they would increase the safety of their property, add to the certainty of their trade, and, above all, would place the lives of their crews at less risk at sea. It would be a blunder financially, and more than a blunder otherwise. And we fear that our good friends the Assessors, who advised the Court that such may have been the case, not only with Messrs. Hill, but with any decent shipowners, have unwittingly and unintentionally failed to impress the Court with the true results of their knowledge and experience."

NOTES FROM CONSULAR REPORTS.

ITALY.

Venice.—British vessels frequent this port in increasing numbers and enjoy a large percentage of the trade. The competition of Trieste, a free port, operates to the disadvantage of Venice. The Malamocco Channel it is hoped will be deepened, so as to afford additional facilities for vessels visiting the port. Details of the trade and shipping are not given in the report, having been fully stated in the Vice-Consul's report for 1879.

Ancona.—This port is not developing satisfactorily. Many alterations are wanted to render the port available for vessels of large size. Cargoes, straw hats, shumac, sulphur, goat and kid-lins, are exported from the vicinity, but Ancona is not always the port of shipment. A proportion of the sulphur obtained from the

Romagna and other mines in the vicinity is shipped, via Ancon, to the United States and elsewhere. Raw goat-skins and some skins are also exported from this district to the United States, with promise of a development of this business.

THE NETHERLANDS.

Amsterdam.—The shipping trade of this port, after suffering a long time from depression and inactivity, appears now recovering itself. A large increase is observable in the trade of vessels arriving at and clearing from the port as compared with preceding years. Since the opening of the North Sea Canal, steam traffic to and from the port has greatly increased, and vessels of much larger capacity can get up to Amsterdam with unbroken cargoes. There seems, however, to be a serious stagnation going on in the number and tonnage of the Amsterdam mercantile fleet, foreign vessels, especially those of Great Britain, taking the bulk of the carrying trade. Coffee, tea and sugar from Java are important articles of commerce at Amsterdam. A large business was done with Java coffee in the year, and a fair amount of refined and raw sugar was exported to various countries. It appears also to have been a good market for Java and Sumatran tobacco, for rice from British India and Japan, for cotton from the United States, Surat, Bengal and Tinnevely, and for grain from various countries. Seeds, spices, tin and hides, all seem to have felt the influence of a commercial revival, and the prospect of a largely increased business with petroleum are exceedingly promising, the demand for consumption being very great.

RUSSIA.

Riga.—A slight falling off in the number of British vessels arriving at and clearing from this port in 1879 is shown in the Consul's report. Coals, railway iron, and general cargoes were principally conveyed to Riga, but more than half of the vessels arrived in ballast. The chief exports from Riga in British vessels were grain and wood of different kinds. An extensive general shipping business is carried on at this port, in which German vessels have the largest share, British vessels being second on the list. The general export and import trades for 1879 are

marked advance as compared with those of preceding years. The imports from Great Britain amounted to nearly 43 per cent. and the exports to Great Britain 38½ per cent. of the whole trade of the port of Riga, but the commodities were not all conveyed in British bottoms.

MANILA.

The report from the Consul shows an improvement in the trade of Manila. The exports are chiefly cigars and tobacco, two-thirds of the entire exports being sent to Great Britain and her possessions, while, of the imports, consisting principally of coal, iron, and rice, eight-ninths come from British ports. There are not sufficient details given to make this account more complete.

CORRESPONDENCE.

ICEBERGS.

To the Editor of the "Nautical Magazine."

SIR,—I have read the letter on Icebergs in the May number of the *Nautical Magazine* with much interest, as it seems to reopen a subject, on which perhaps too little has been said.

Your correspondent states that "the sorely beset navigator with his heart in his mouth, prays for deliverance from the wall of ice that his fancy fears may be in his track, and which he is conscious that his own watchfulness, or that of his officers may be unable to avoid." Which would lead us to suppose that it is impossible to cross the Atlantic without encountering ice or fog—a theory from which I beg most emphatically to dissent.

He also states "a great number of vessels are continually crossing their track," that is, the track of icebergs, and also, "the track is in a region where fogs are notoriously prevalent." I presume by this "crossing" he refers to the advertised route of the Cunard steamers, which is supposed to cross the meridian of 70° W., at the intersection of the parallel of 43° N., on which route I have no hesitancy in saying that the majority of steamship masters in the North Atlantic trade will agree, there will

probably be more hours of fog experienced, than on any other that could be taken.

Now, sir, we are told that "Providence helps those who help themselves," and I respectfully submit that the surest way to obtain the help of Providence in clearing icebergs, is by crossing the Atlantic in the ice season, from March to July or August inclusive, by a route where the chances of not encountering fog are reduced almost to a certainty—that is, by sailing on the Great Circle, or nothing to the north of it, from Fastnet Rock to the intersection of the meridian of 45° W. with the parallel of 40° N., thence to 50° W. and 40° N., and from thence to Sandy Hook.

In fifteen years' experience in the North Atlantic steam trade I have made about twenty passages, mostly eastern ones, in the vicinity of this track, during the summer months, and find, referring to my abstracts, that I have encountered fog only on two of them, and for about three hours only, on each of those two passages. My western passages have been made usually between 50° W. and 48° N., on which route I have sometimes encountered dense fog for three successive days. On this track, in May, 1882 I saw thirty bergs; in June, forty; while on my eastern passages by the southern route, I saw only one during the entire season.

It will no doubt be urged, as an objection to this route, that when bound west the Gulf Stream will have to be stemmed. My experience has been that when I have crossed the meridian of 50° W. on the parallel, or to the southward of $40^{\circ} 30'$ N., the maximum amount of easterly current found, has been twenty-four miles in four days, between 65° and 40° W., and I have known it to be as little as eight miles in the month of July, between the same meridians; but crossing the same longitude, between 41° and 42° N., I have experienced as much as one hundred and ten miles in the same time.

Therefore, judging from this experience of twenty passages in the summer months, by sailing from thirty to a hundred miles to the northward of the described track, when bound east, between the meridians of 65° and 45° W., an easterly current would no doubt be found, with the further advantage of a shorter distance, but not with as perfect immunity from fog; and when bound west, I

sailing on this track, or a little to the southward of it, very little, if any, current would be experienced, with almost, if not quite, entire absence of fog.

The difference between the two routes in going west (the one now generally followed and the one described) in distance is about one hundred miles, which surely is insignificant, even in these days of competition and rivalry, when the fact is taken into consideration that by the one route we have almost complete immunity from fog, and by the other a probability—I had almost written certainty—of encountering fog for hours, perhaps days, of every passage.

In conclusion, I reiterate my assertion that here is a route for crossing the North Atlantic during the ice months, almost, if not entirely, free from fog between the longitudes of 40° and 65° W., with the disadvantage only of being seventy-five to a hundred miles longer than the one now usually taken by first-class steamships. Only those who have commanded a steamer running between three and four hundred miles a-day through a dense fog, with a thousand lives depending upon his individual judgment, can realise the relief from anxiety that following such a route would give them.

I am, Sir, respectfully yours,

AN "ATLANTIC MAIL STEAMSHIP" MASTER.

New York, May 24th, 1881.

SEA ANCHORS.

To the Editor of the "Nautical Magazine."

Sir,—I have noticed with pleasure that in the examination for masters and mates they are required to know how to rig a sea anchor. I think more than that is required. All steamships should be obliged to carry one ready for use. It is not a difficult thing to rig if you have spare spars, but there is not one steamer out of twenty that has. Also, when a sea anchor is wanted in a heavy gale, it is not a nice time for rigging one. In my opinion the great cause of loss and damage to screw-steamers is that you cannot heave them to with the engines stopped. You are obliged to keep steerage way on them, which forces them against the sea, adding greatly to the risk of taking in heavy water. Many long,

lean ships do best head on to the sea, and it requires very much attention both to speed and steerage to keep so with safety. A ship may break down. A friend of mine broke his shaft in a heavy S.W. gale, and came very near foundering, he could not keep his ship to. With great difficulty, from the sea breaking overboard, he got out the best sea anchor he had the means of rigging out, it was not enough; as a last resource he paid out several fathoms of cable, the ship then rode the gale out very well. He considered that he saved the ship and all on board.

The Chinese junks all carry a sea anchor made like an umbrella of wicker work to which they ride out the heaviest gales.

I would suggest that all steamers should be fitted with a sea anchor, carried in a place where it could be let go easily, and strengthened with Bullivant's steel wire ropes. In an owner's point of view it would save a lot of coal. I feel sure that many steamers that are now at the bottom would be afloat if so fitted.

If you will kindly insert this in your valuable Magazine, both parties will be hands at the pen than I will no doubt write on the subject.

I am, Sir, your obedient servant,

SHELL BACON

P.S.—Fishing boats ride out very heavy weather to their advantage heavier than they could live in otherwise.

STEAMERS' SIDE-LIGHTS.

To the Editor of the "Nautical Magazine."

SIR,—In the February number of your valuable Magazine I have read with much interest a letter on "Side-lights in Steamers." My own writer's views have always been upheld by seamen, viz., the side-lights of steamers should be placed *abaft* the masthead-light at least 40 feet.

The advantages would be as follows:—

1st. An approaching vessel could judge within a point by the angle contained between the side and masthead-lights the approximate course of the steamer.

2nd. Any alteration in her course would immediately make it apparent by the closing or opening of the lights.

3rd. The side-lights would be under the eye of the officer of

catch who could assure himself of their being burning brightly without leaving the bridge.

Apologising for trespassing on your valuable space,

I am, Sir, yours faithfully,

Aden, 25th May, 1881.

W. D. G. W.

STRAITS SETTLEMENTS CERTIFICATES.

To the Editor of the "Nautical Magazine."

SIR,—Could you enlighten me as to the reason for the conclusion arrived at in par. 16 of the enclosed finding of a Naval Court held here?

By answering in the *Nautical* you will oblige a great section of your subscribers in the East.

I am, yours respectfully,

Shanghai, 16th April, 1881

CHINA.

[The said paragraph runs thus:—"The Court possesses no power to deal with the certificate held by the master of the —, as the certificate was granted by the Government of the Straits Settlements, &c." This is correct; the certificate being issued for local purposes under a Local Act, and not under an Order in Council, it is not recognised as a valid certificate; consequently, the Court could not deal with it. The same thing has occurred at Courts of Inquiry in British ports; but here, although the certificate issued at an unrecognised place could not be dealt with (i.e., suspended or cancelled), the master would not be allowed to clear a ship from any British port until he had obtained a valid certificate of competency.—Ed. N. M.]

BOOKS RECEIVED.

Tables relating to Life Salvage on the Coasts of the United Kingdom during the Year ending 30th June, 1880; showing the different Life-Saving Apparatus Stations, with particulars of Services rendered by the Rocket Apparatus, and the Number of Lives Saved. London: Issued by the Board of Trade, May, 1881.

This is a brief history of the apparatus used in life salvage, with statistics of the work done on the coasts of the United Kingdom.

Though the Government had, at an early date, taken Captain Manby's mortar, and other appliances for saving life, under its protection, the management was under no special Government department until 1855, when it was placed under that of the Board of Trade. In the course of time, after numerous practical experiments, the rocket was found to have superior advantages over the mortar as a means of obtaining communication with a stranded vessel, and the latter is now abandoned by the Board of Trade. Thus the chief means of saving life on our coasts are the lifeboats of the Royal National Lifeboat Institution and the rockets and sling life-buoys, and all certificated officers of the Mercantile Marine and the men of the Royal Naval Reserve are required to understand the working of the latter. It would appear from the statistics that the number of vessels stranded must be steadily decreasing; since it was 1,489 in 1876-7; 1,349 in 1877-8; 1,244 in 1878-9; and 1,099 in 1879-80; while in the same years the lives lost through strandings have been 472, 154, 147 and 80—due evidently to the number of lives risked being considerably smaller than in previous years. Last year, 322 lives were saved by lifeboats; 162 by rocket apparatus; 235 by luggers, coastguard boats, and small craft; 682 by ships and steamboats; 1,418 by ships' own boats; and 104 by individual and other means, making a total of 2,923 for the year, and 94,669 for the last 24 years. Of places supplied with life-saving apparatus there are 289, viz., in England and Wales 186, in Scotland 44, in Ireland 52, in Isle of Man 4, in Channel Islands 1, and in Helgoland 2; but belts and lines are supplied to 366 places. Of lifeboats there are 212 in England and Wales, 45 in Scotland, 33 in Ireland, 4 in the Isle of Man, and 3 in the Channel Islands. It cannot be denied that it is a good feature that special rewards for bravery and distinguished services in connection with the life-saving apparatus are given in certain cases by the Board of Trade. A notable example, is £30 to the orphan daughter of David McClements "in recognition of the gallant conduct of her late father, who, when the Swedish schooner *Eugene* was wrecked off Rickham, went with others into the surf to attempt to rescue the sole survivor of the crew, but

being overwhelmed by a heavy sea, both David McClements and the shipwrecked man were swept away and drowned." Altogether, this pamphlet is a record of noble service, and it is well the country should know what is being done for the saving of life on our extended sea shores.

Report on Trichinæ and Trichinosis, prepared under direction of the Supervising Surgeon-General. By W. C. W. Glazier, M.D., United States Marine Hospital Service. Washington. 1881.

THIS work is the outcome of a resolution of the United States Senate "that the Secretary of the Treasury be directed to furnish copies of any documents in the possession of that department, touching trichinæ in swine, and the restrictions upon trade with foreign countries in consequence of this disease." The report is lengthy and elaborate, including the history of the discovery of *Trichinæ spiralis*; its natural history; theories of origin; history of trichinosis; statistics of epidemics; diagnosis, pathology and treatment; symptoms of trichinosis in animals; laws governing the pork trade in Europe; results of the examination of European and American pork; recommendations as to precautionary measures in making examinations; trichinosis in the United States. It does not profess to be original, and much of it is a free translation from German authorities. It is, however, largely illustrated, and a complete handbook on the subject discussed. Jack eats a wonderful amount of pork in his time, and it is certain that he at least will not be much interested in the question of the diseases of swine; he may, however, in common with the rest of the community, be glad to be informed that the adverse action of foreign governments in respect of American pig-meat is based upon erroneous information of the actual condition of the exported article.

Cries in a Crisis, anent Free Trade in Manufactures shattered by concessive Treaties and aggressive Bounties that favour Foreign Aims upon our Industries and Shipping; and anent the Empire and Emigration, Parliament and its Procedure. Compiled by R. A. Macfie, &c., Second Edition, enlarged. London: Stanford, Charing Cross. 1881.

We have already expressed our views on the first edition of this work; but we cannot say that the additional matter which has

been introduced into this enlarged edition tends in any way qualify our former opinions.

The Great Taifun of August (19th, 27th), 1880, with a Chart and Diagrams. By E. Knipping. Yokohama. 1881.

WE have frequently had occasion to notice Mr. E. Knipping's pamphlets on the typhoons in the vicinity of Japan, and when speaking of his indefatigable industry in collecting information respecting these storms, have always expressed ourselves well satisfied with his method of investigating and treating the subject. Heretofore, his brochures have been written in the German language, but this essay, dealing with the typhoon of August 1880, which traversed the coasts of Japan and the Kurile Islands, is written in English. It ought to be appreciated by those of our shipmasters into whose hands it falls. Especially will they find his observations on the "bearing of the centre" worthy of their consideration.

The Practical Guide to the Use of Marine Steam Machinery, and Internal Management of Small Steamers, Steam-yachts, and Steam-launches. By James Donaldson, Engineer. London: Charles Wilson, 157, Leadenhall Street.

In a compact and handy volume of 126 pages, with 27 illustrations, Mr. Donaldson has succeeded in producing a useful guide for the assistance of the non-professional engineer yachtsman who may be on occasion thrown upon his own resources, or who may desire to acquire sufficient knowledge of the steam-engine to enable him to handle the machinery of his yacht or launch with safety; it will also be of service to young engineers who are about to proceed to sea for the first time. The work abounds in judicious hints and cautions as to the care and preservation of steam-craft, and, taken as a whole, may be considered a valuable addition to the yachtsman's library.

Good Advice to Seamen. By an Old Sailor. Dundee: John Leng and Co. 1881.

THERE is scarcely a subject connected with a seaman's career from boy to master that is not touched upon in this small book of sixty-

eight pages—and that with ability, circumspection and kindness : moreover, we could extract passage after passage of genuine good advice for all ranks of the profession, but it will be sufficient if we recommend every seafarer to invest a sixpence and read the work in its entirety ; it is sound, wholesome reading, with a practical bearing, and will do him good ; and he may be sure it is the outpouring of an an old salt of some experience.

Die Wirbelstürme oder Cyclonen mit Orkan-gewalt, nach der jetzigen Standpunkt unserer Kenntniss derselben. Von A. Schück. Oldenburg : Schulzesche Buchhandlung, 1880. 8vo., 124 pp., xi. Talfelu.

(" Whirlwinds, or Cyclones of Hurricane force, according to the present condition of our knowledge of them." By A. Schück.)

ALTHOUGH the literature of cyclones is very copious, anyone who has to deal practically with ship's logs will recognise that there is still much to be learnt about them. In the first place, Captain Schück quotes in his preface a very just remark which he heard from one of his early captains, " If you read too much about revolving storms you will expect to find that every storm you encounter runs the full course of a tropical cyclone." And in the second, when the seaman actually is in a cyclone, the instructions for handling his ship are far from being uniform. The old rule that the wind blows in circles—an idea which, as Piddington says (Hornbook, p. 108, 3rd ed.), took its origin from a wish to suit the convenience of Mr. Redfield's engraver!—is still to be found in many handbooks otherwise of justly high authority, while every modern writer on the subject, with the single exception of M. Bridet, adopts the view that the wind blows in spirals.

The paramount importance of further investigation of the subject is very forcibly stated by Mr. Rosser in the following words :—

" The characteristic difference between the two forms of storms in relation to navigation lies in this—and herein consists the danger :—winds which, according to the circular theory, are held to be safe, unless recklessly used, are, according to the spiral theory,

found to exist in the advancing front of the dangerous semicircle, where also their tendency towards the centre is greater than in any other part of the storm field. As the surrounding body of air, even at a distance, is streaming in the direction of the centre of greatest depression, a ship, while utilising any of the winds as a fair one, is gradually involved in the cyclone; then, if she has really been brought to the advancing front of the dangerous semicircle, instead of to a part of the storm usually deemed safer—and the navigator is misled to this extent—disaster must follow as a consequence. When the *Edinburgh Review* of 1839, discussing the circular theory, first promulgated the notion of 'infallible rules' for storm sailing, the knell was sounded heralding the loss of innumerable lives, and the casting away of an immensity of property." (*The Law of Storms Considered Practically*, by W. H. Rosser, p. 108. London: C. Wilson, 1876.)

We, therefore, welcome Captain Schück's little work, as we know him to be firstly, a practical seaman of long experience, especially in the China Seas, and, secondly, to be a most careful collector of data to illustrate the actual phenomena he seeks to explain. In the preparation of this work he has visited the principal Meteorological Institutes of Northern Europe, and from the facilities they afforded him has amassed a large amount of valuable extracts from logs of recent date.

Captain Schück has set himself as a special task to study the direction of the wind and the behaviour of the barometer within the storm area in order to see whether any rules could be given to enable a captain to ascertain the bearing and distance of the centre from him from the course of either phenomenon. He has collected twenty-five cases in which two or more ships were simultaneously near the centre of the same storm, and tabulated the observations. As regards the barometer the examples distinctly show that its height or rate of falling is no certain test of proximity to the centre, in fact, in two cases, the mercury had begun to rise before the central calm, or the shift of wind, was reached. As for the direction of the wind, distinct evidence is cited to show that small subsidiary eddies often exist within the area of the main cyclone.

Captain Schück points out, what need hardly be said to the careful seaman, "That no single phenomenon preceding or during a cyclone is to be observed and attended to exclusively, but that equal care must be paid to the record of every atmospherical phenomenon, and every instrument." And he gives as his final opinion, what entirely agrees with our own, at p. 44:—"All that has been said proves clearly that we are as yet only beginning to comprehend the facts which enable us to gain a general view of the phenomena of cyclones and hurricanes, and of the changes which take place in them. It therefore follows that we can never give a captain *rules* for his action in a cyclone, as we cannot determine for him the amount of exceptions to these rules which may become necessary. We must, therefore, confine ourselves to giving him advice."

We may add that Captain Schück gives at pp. 14-15 a most graphic description of the phenomena of a cyclone at sea, and the last half of the work contains a series of extracts from ships' logs in such storms, carefully analysed and compared with each other, and therefore affording a copious store of information for the guidance of the seaman.

Supplement to Second Edition of the Dock and Port Charges of Great Britain and Ireland. By Robert Thubron. London: C. Wilson, 157, Leadenhall Street. 1881.

In this supplement to an exceedingly valuable book of reference, we find details of alterations, extensions, new docks, and the latest rates payable, since the publication of the second edition of the book.

We have previously expressed our opinion concerning the merits of this work, and as regards the supplement now issued, we find it to be equal in all respects to the former editions, and by bringing the information up to the latest date, it is made especially valuable to shipowners, shippers and Mercantile Marine officers.

Mr. Thubron appears to be a most painstaking and conscientious compiler, and he well deserves the success which we know his work has obtained.

TIDE TABLES FOR JULY, 1881.

Also Ports of Reference for the Constants in the next Table.

WEEK DAY.	MONTH	LONDON BRIDGE.		HULL.		NORTH SHIELDS.		LEITH.		DEVON- PORT.		DOVER.		WESTON- SUPER- MARE.		LIVER- POOL.		GREEN- OCK.		QUEENS- TOWN.		KINGS- TOWN.		LONDON- DERBY.		BREST.		
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
P	1	4 40	5 57	9 10	9 28	6 5	6 23	6 1	5 56	5 56	8 38	8 53	2 21	2 40	9 59	10 15	2 16	2 34	3 31	3 28	3 15	3 32	2 11	2 30	11 10	11 38	6 22	6 40
S	2	5 14	5 30	9 46	10 4	6 41	7 0	5 86	5 56	8 38	8 53	2 21	2 40	9 59	10 15	2 16	2 34	3 31	3 28	3 15	3 32	2 11	2 30	11 10	11 38	6 50	7 18	
W	3	5 48	6 9	10 24	10 42	7 21	7 43	6 17	6 39	9 11	9 31	2 59	3 18	10 31	10 47	2 52	3 11	4 1	4 0	8 50	9 10	3 50	3 11	11 50	—	7 38	7 59	
Th	4	6 20	6 40	11 8	11 36	7 52	8 12	7 27	7 47	9 53	10 13	3 38	3 48	11 6	11 22	3 31	3 51	4 20	4 43	9 31	9 53	3 33	3 53	12 10	—	8 12	8 33	
F	5	7 14	7 35	—	—	9 0	9 31	8 55	8 35	10 59	11 9	4 23	4 43	—	—	4 20	4 40	5 6	5 30	10 17	10 45	4 21	4 41	12 10	—	8 12	8 33	
W	6	8 5	8 35	0 35	1 0	10 38	10 58	9 31	9 31	11 43	—	5 10	5 38	0 52	0 52	5 21	5 41	6 2	6 33	11 17	11 53	5 20	5 40	12 10	—	8 12	8 33	
Th	7	9 10	9 41	1 36	2 18	11 13	11 40	10 40	10 40	—	—	6 10	6 38	1 37	2 4	6 38	6 58	7 7	7 43	—	—	6 25	6 45	12 10	—	8 12	8 33	
F	8	10 21	10 56	2 41	3 13	—	0 20	11 13	11 44	1 36	2 13	7 57	8 25	2 43	3 50	7 48	8 28	8 19	8 54	1 6	1 48	7 34	8 7	12 10	—	8 12	8 33	
S	9	11 32	—	3 47	4 18	0 50	1 19	—	0 13	3 53	3 27	8 30	9 0	3 59	4 33	8 52	9 20	9 25	9 57	2 18	2 51	8 59	9 11	12 10	—	8 12	8 33	
Th	10	0 5	0 35	4 47	5 14	1 47	2 11	0 41	1 9	4 0	4 39	9 30	10 0	5 10	5 41	9 47	10 14	10 27	10 57	3 22	3 51	9 41	10 9	12 10	—	8 12	8 33	
W	11	1 9	1 30	5 41	6 18	2 40	3 8	1 32	2 2	4 57	5 10	10 32	10 58	6 10	6 41	10 40	11 9	11 27	11 57	3 30	4 0	10 34	10 38	12 10	—	8 12	8 33	
Th	12	1 57	2 30	6 35	7 11	3 28	3 53	2 27	3 27	5 51	6 10	11 26	11 53	7 0	7 33	11 32	11 58	0 46	1 13	4 20	4 51	11 34	11 38	12 10	—	8 12	8 33	
W	13	2 47	3 19	7 26	7 50	4 18	4 39	3 16	4 24	6 43	7 51	0 45	0 10	8 13	8 13	0 46	1 6	0 85	1 58	5 13	5 7	12 10	12 10	12 10	—	8 12	8 33	
Th	14	3 36	4 0	8 14	8 37	5 6	5 30	4 0	5 14	7 30	8 38	1 34	1 54	9 23	9 23	1 32	1 58	1 32	2 43	6 10	6 41	12 10	12 10	12 10	—	8 12	8 33	
F	15	4 24	4 49	9 0	9 23	5 54	6 18	4 48	5 12	8 19	9 35	2 24	2 44	10 10	10 24	2 10	2 38	2 7	3 20	7 21	7 52	12 10	12 10	12 10	—	8 12	8 33	
S	16	5 12	5 34	9 46	10 9	6 43	7 0	5 37	6 2	9 50	10 16	3 22	3 42	11 0	11 14	3 0	3 28	3 7	4 0	8 42	9 13	12 10	12 10	12 10	—	8 12	8 33	
Th	17	5 57	6 24	10 33	10 56	7 30	7 56	6 27	6 52	10 36	10 57	4 9	4 29	12 0	12 14	3 1	3 29	3 1	4 0	9 32	10 0	12 10	12 10	12 10	—	8 12	8 33	
W	18	6 43	7 11	11 25	11 56	8 24	8 53	7 19	7 48	10 19	10 43	5 55	6 18	1 20	1 34	4 13	4 31	4 30	5 1	9 48	10 19	12 10	12 10	12 10	—	8 12	8 33	
Th	19	7 30	7 59	—	—	9 27	9 54	8 57	9 15	11 11	11 36	6 41	6 59	0 16	0 16	5 42	5 13	5 37	5 55	10 19	11 1	12 10	12 10	12 10	—	8 12	8 33	
W	20	8 20	8 50	1 0	1 28	10 38	10 58	—	—	12 10	12 10	7 30	7 48	0 47	1 23	6 30	6 30	6 27	6 45	11 49	—	12 10	12 10	12 10	—	8 12	8 33	
Th	21	9 10	9 40	2 13	2 41	11 45	12 10	10 38	11 12	0 40	1 27	8 42	9 0	1 32	1 41	7 10	7 40	7 41	8 19	12 10	1 6	12 10	12 10	12 10	—	8 12	8 33	
F	22	—	—	3 11	3 41	12 10	12 10	11 45	—	1 5	2 42	9 57	10 32	2 30	2 39	8 23	8 53	8 54	9 32	12 10	1 6	12 10	12 10	12 10	—	8 12	8 33	
S	23	0 9	0 19	4 19	4 48	1 22	1 50	0 15	0 43	3 18	3 48	9 1	9 27	3 54	4 4	9 22	9 45	9 50	10 25	2 52	3 19	9 11	12 10	12 10	—	8 12	8 33	
W	24	0 38	1 2	5 12	5 34	2 11	2 39	1 6	1 28	4 10	4 40	9 51	10 14	5 10	5 55	10 37	10 57	10 45	11 10	3 42	4 10	10 10	10 22	12 10	—	8 12	8 33	
Th	25	1 25	1 47	6 54	6 15	3 03	3 10	1 48	2 7	5 2	5 22	10 35	10 54	6 17	6 57	11 0	11 41	11 31	12 10	4 25	4 43	10 30	10 52	12 10	—	8 12	8 33	
F	26	2 12	2 34	7 42	7 03	3 52	4 0	2 36	3 4	6 1	6 1	11 22	11 41	7 0	7 41	12 10	12 10	12 10	12 10	5 12	5 30	11 0	11 22	12 10	—	8 12	8 33	

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

plying the Tidal Constant of the place, according to its sign (+ add, to the time of high water on the given day at the port of reference, you time of high water at the place sought.

PLACE.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
	H. M.			H. M.	
Leith	-1 17	Leith	Jersey (St. Helier)	+2 38	Brest
Liverpool	-3 53	Liverpool	Kinsale	-0 18	Queenstown
Brest	+2 59	Brest	Lerwick (Shetland)	-3 47	Leith
Dover	+5 13	Dover	Limerick	+1 15	Queenstown
Leith	-0 42	Leith	Lisbon bar	-1 17	Brest
Brest	+0 50	Brest	Littlehampton	+0 24	Dover
Kingstown	-2 25	Kingstown	Llanelly bar	-0 38	Weston-s.-Mare
Greenock	-0 18	Greenock	Lowestoft	-4 1	London
Leith	-1 49	Leith	Lynn & Boston Deep	-0 29	Hull
Queenstown	-1 14	Queenstown	Margate	-2 18	London
Weston-s.-Mare	-0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
Brest	-0 2	Brest	Milford Haven entr.	-0 58	Weston-s.-Mare
Dover	+0 8	Dover	Montrose	-0 52	Leith
Liverpool	-0 51	Liverpool	Morlaix	+1 6	Brest
Londonderry	+2 42	Londonderry	Needles point	-1 26	Dover
N. Shields	-1 5	N. Shields	Newcastle	+0 23	N. Shields
N. Shields	-0 8	N. Shields	Newhaven	+C 39	Dover
Brest	+3 8	Brest	Newport	+0 16	Weston-s.-Mare
Dover	+0 13	Dover	Nieuport	+1 6	Dover
Devonport	+0 23	Devonport	Nore	-1 28	London
Weston-s.-Mare	+0 19	Weston-s.-Mare	Orfordness	-2 43	London
Brest	-2 2	Brest	Oporto	-1 17	Brest
Liverpool	-1 56	Liverpool	Ostende	+1 13	Dover
Dover	+0 37	Dover	Padstow	-1 41	Weston-s.-Mare
Greenock	-0 23	Greenock	Peel, Isle of Man	-0 15	Liverpool
Weston-s.-Mare	+0 2	Weston-s.-Mare	Pembroke Dock	-0 42	Weston-s.-Mare
Liverpool	-4 23	Liverpool	Penzance	-1 13	Devonport
Kingstown	-0 10	Kingstown	Peterhead	-1 43	Leith
London	-0 47	London	Piel harbour, Barrow	-0 18	Liverpool
Brest	+4 2	Brest	Plymouth breakwater	-0 6	Devonport
Londonderry	-1 87	Londonderry	Poole	-2 2	Dover
N. Shields	-0 23	N. Shields	Port Carlisle	+0 47	Liverpool
Brest	-0 10	Brest	Portland breakwater	+1 18	Devonport
Dover	-0 27	Dover	Port Patrick	-0 58	Greenock
Greenock	+4 41	Greenock	Portsmouth	+0 29	Dover
Leith	-2 21	Leith	Ramsgate	-2 19	London
Devonport	+0 33	Devonport	Rotterdam	+4 33	Dover
Dover	+0 3	Dover	Santander	-0 17	Brest
Brest	+7 19	Brest	Scarborough	+0 48	N. Shields
Kingstown	+0 3	Kingstown	Selsea bill	+0 33	Dover
Queenstown	+0 17	Queenstown	Sheerness	-1 21	London
Liverpool	-0 11	Liverpool	Shoreham	+0 22	Dover
Kingstown	+0 3	Kingstown	Sligo bay	+0 17	Queenstown
Greenock	-0 16	Greenock	Southampton	-0 42	Dover
Dover	-0 27	Dover	Spurn point	-1 3	Hull
Dover	+0 50	Dover	St. Ives	-2 10	Weston-s.-Mare
Devonport	+0 38	Devonport	St. Malo	+2 18	Brest
Devonport	-0 46	Devonport	St. Mary (Scilly)	-1 16	Devonport
Brest	+6 57	Brest	St. Nazaire	-0 7	Brest
Brest	-0 47	Brest	Stornoway	+6 38	Greenock
Hull	-1 59	Hull	Stromness (Orkneys)	-5 17	Leith
Liverpool	-0 12	Liverpool	Sunderland	-0 1	N. Shields
Dover	-0 5	Dover	Swansea bay	-0 53	Weston-s.-Mare
Devonport	-0 23	Devonport	Tay bar	-0 11	Leith
Dover	+1 42	Dover	Tees bar	+0 23	N. Shields
Queenstown	-0 26	Queenstown	Tenby	-1 13	Weston-s.-Mare
Brest	-1 27	Brest	Thurso	-5 49	Leith
Greenock	+0 10	Greenock	Torbay	+0 17	Devonport
Weston-s.-Mare	+2 51	Weston-s.-Mare	Tralee bay	-0 58	Queenstown
Brest	+2 25	Brest	Ushant (Ouessant)	-0 13	Brest
London	-0 48	London	Valentia harbour	-1 19	Queenstown
Hull	-0 53	Hull	Waterford	+0 19	Queenstown
Brest	+2 50	Brest	Westport	-0 4	Queenstown
N. Shields	+0 5	N. Shields	Wexford	+2 20	Queenstown
London	-1 52	London	Whitby	+0 22	N. Shields
Brest	+6 4	Brest	Whitehaven	-0 9	Liverpool
Dover	+0 21	Dover	Wick	-2 55	Leith
Liverpool	-1 12	Liverpool	Wicklow	-0 41	Kingstown
N. Shields	-0 23	N. Shields	Workington	-0 19	Liverpool
Brest	+5 42	Brest	Yarmouth road	-4 43	London
Leith	-1 59	Leith	Youghall	+0 13	Queenstown

MONTHLY ABSTRACT OF NAUTICAL NOTICE

No.	PLACE.	SUBJECT.
199	ENGLAND—South Coast—Eddystone	New lighthouse partially the light.
200	" Bristol Channel—King Road	Buoy removed
201	" West Coast—River Dee	Alteration of buoys.
202	NORTH SEA—West Schelde River—Nieuwe- polder	New light.
203	" Ameland Island	Exhibition of new light.
204	" Elbe River — Elbe light- vessel, No. 2	Alterations and pilot regula
205	BALTIC—Schleswig-Holstein—Kell Fiord	Buoyage.
206	" Pomerania — Greifswald Bay— Palmerort	Light-vessel replaced.
207	NORWAY—West Coast—Yttero	Proposed new light.
208	" " Oxhammer	Intended alteration of light
209	" " Alnæs	Intended alteration of light
210	" " Ulla	Intended alteration of light
211	" " Lofoten Island— Glopen	Alteration in period of exhib
212	FRANCE—North Coast—Havre	Change in position of son light.
213	SPAIN—West Coast—Vigo Bay	Buoyage and beacon.
214	MEDITERRANEAN — Tripoli — Kartil-al- Mosin and Ras Misratah	New lights.
215	" Greece—Corinth Gulf	Torpedo ground.
216	" Candia—Suda Bay	North entrance barred by d
217	" Dardanelles	Regulations at night str forced.
218	NORTH ATLANTIC—Cape Verde Islands— St. Jago Island	New lights.
219	" " Fogo Island	New light.
220	" " Brava Island	New light.
221	AFRICA—West Coast—St. Paul de Loando	Particulars of light and bea
222	INDIAN OCEAN—Gulf of 'Oman — Cape Jashak	Clearing marks for telegrap
223	INDIA—West Coast—Bombay—Kolaba	Beacons for clearing S.W. I
224	" Gulf of Manar—Paumben Pass	Range of visibility of light.
225	" Bay of Bengal—Madras	North buoy finally removed
226	EASTERN ARCHIPELAGO — Strait of Ma- cassar	Reported reef.
227	JAPAN — Kiusiu — Nagasaki Harbour — Kagano Sima	New light.
228	SOUTH AUSTRALIA—Spencer Gulf—Port Pirie	Deepening operations.
229	WEST INDIES—British Honduras—Belize —Mauger Cay	Particulars of lights.
230	" Cuba—Port Guantánamo	Harbour lights on mole.
231	UNITED STATES—Virginia—Bell's Rock	New light.
232	CANADA—Prince Edward Island—Char- lottetown—St. Peter Island	New light.
233	" " Tignish River Entrance	Lights discontinued, and n established.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

199.—ENGLAND.—*South Coast.—Eddystone New Lighthouse.*—The erection of the Eddystone new lighthouse is now so far advanced as to obscure the Eddystone light through an arc of 10° —between the bearings of N. 14° W. and N. 24° W. from seaward. *Variation, 20° W.*

200.—ENGLAND.—*Bristol Channel.—King Road.—Flatness Rocks Buoy Removed.*—The position of Flatness rocks being now sufficiently indicated by marks on the shore, the buoy heretofore moored near them has been removed. The marks to clear Flatness rocks are now—by day, a red hut, 15 feet high, on the north-west extreme of Dumball island, in line with a white hut, having a pole 45 feet high, bearing E. by S. from the red hut, distant 750 yards. By night, the green lights exhibited from these huts (leading lights through King road) in line. *Variation, $19\frac{1}{2}^{\circ}$ W.*

201.—ENGLAND.—*West Coast.—River Dee.—Alteration of Buoyage.*—The undermentioned buoys in the river Dee have been shifted from their former positions, and are now placed as stated below, viz.:—Greenfield Gut buoy has been removed half a cable's length north, and now lies in five feet at low water spring tides, with Llanacamoer chimney, in line with trees on south end of wood on back land, West $S^{\frac{1}{2}}W$; The northernmost lower chimney at Greenfield, in line with the south end of a large block of buildings at Holywell, S. W. $\frac{1}{2}$ W. Bug No. 2 buoy has been removed one cable's length E. S. E., and now lies in four feet at low water spring tides, with Llanacamoer chimney, in line with the south end of a wood on high back land, W. $\frac{3}{4}$ N.; The southernmost of Dee bank chimneys, just open of low short thick chimney, Bug No. 1 buoy, N.W. (distant $\frac{7}{10}$ ths of a mile.) Bug No. 3 buoy has been removed two cables' length S.W. by S., and now lies in four feet at low water spring tides, with Eye Beacon, its length open south of the beach mark, N. by W.; Llanacamoer chimney, in line with north end of a wood in back high land, W. by N; Bagilt chimneys in line, S.S.W. Elbow

buoy removed half-a-mile S., and now lies in three feet at low water spring tides, with Flint castle, on with clump of trees on back land, South; A white flagstaff to the right of Heswell church, midway between two conspicuous clumps of trees in the centre of a wood, E. by N.

202.—NORTH SEA.—*West Schelde River.—Light at Nieuwepolder.*—A fixed white light is exhibited from a wooden post just eastward of Keel, on the north-west point of Nieuwepolder (Nieuw-neuzenpolder), south bank of West Schelde river. Position, lat. $51^{\circ} 21' 0''$ N., long. $3^{\circ} 46' 20''$ E. This light serves as a cross-mark for the Pas van Neuzen, westward of Suiker plaat, indicating, when sighted, that the high leading light at Nieuw Neuzen must be brought open a little to the westward of the low light, in order to clear the shoal ground which has extended out to near the black buoy, No. 5, of the Suiker plaat.

203.—NORTH SEA.—*Light on Ameland Island.*—With reference to Notice 167, p. 487, on the probable exhibition of a light from a lighthouse recently erected on the western sand hill of Ameland island, during the first half of May, 1881, notice has been given, that on 10th May, 1881, the light would be exhibited.

204.—NORTH SEA.—*Elbe River.—Elbe Light-Vessel, No. 2.—Alteration in Day Marks, Pilot Regulations.*—From 29th April, 1881, Elbe light-vessel, No. 2 (*Caspar*), would carry two black globes, placed vertically, at the mainmast-head, instead of the blue and white flag as previously. The lower globe is 7 feet in diameter, the upper globe is smaller. In extraordinary cases when the pilots of vessels outward bound, cannot be called for at the station Elbe light-vessel, No. 2 (*Caspar*), a red flag will be carried at the foremast-head of that light-vessel; and while this flag is shown, pilots have no claim to be called for at this station.

205.—BALTIC.—*Schleswig-Holstein.—Kiel Fiord Buoyage.*—All the buoys marking the channel in Kiel fiord have been replaced in position, with the exception of the conical buoy *Kiel B.*, which would also shortly be re-moored, on the western side of the channel. It is intended that a buoy fitted with an automatic signal shall be moored in the position previously occupied by the buoy *Kiel A.* on the west side of the entrance to Kiel fiord.

06.—BAL TIC.—*Pomerania*.—*Greifswald Bay*.—*Palmerort* at-Vessel replaced in position.—Now replaced in position in gerinne channel, Greifswald bay.

07.—NORWAY.—*West Coast*.—*Intended Light on Ytterö*.—towards the close of the summer of 1881 (should no unforeseen amstances prevent), a light will be exhibited on Ytterö (eröerne), near Kinn. It will be a *flashing* light of the first r. Position, lat. $61^{\circ} 34' 15''$ N., long. $4^{\circ} 41' 10''$ E. Further particulars will be given in due course.

08.—NORWAY.—*West Coast*.—(1) *Oxhammer Light*.—*Intended variations*.—On 15th July, 1881, the following alterations would be made in Oxhammer light, east point of Selbiörnsö:—The light will be visible through the previously obscured arc between the rings of N.E. $\frac{1}{2}$ N. and N. by E. $\frac{1}{2}$ E.; and will show a sector of light between the bearings of N.E. $\frac{1}{2}$ N. and N. $\frac{1}{2}$ E. (in the section of Engesund channel). Variation, $17\frac{1}{2}^{\circ}$ W.

09.—NORWAY.—*West Coast*.—*Alnæs Light*.—*Intended Sector Green Light*.—On 1st August, 1881, a sector of green light will be shown from Alnæs lighthouse, north-west point of Godö and, between the bearings of S.E. and S.E. by S. The bearing S. leads one cable southward of Breiflua, also southward of Fauskin. The bearing S.E. by S. leads half a cable northwards of Björneboen, about midway between Kalsboen and Oddeboen, also northward of Klovskallen. Variation, $16\frac{1}{2}^{\circ}$ W.

10.—NORWAY.—*West Coast*.—*Ulla Light*.—*Intended Sector of Red Light*.—On 25th January, 1882, a sector of red light will be shown from Ulla lighthouse, on Kværnholm, between the bearings S. by W. $\frac{1}{2}$ W. and S.S.W., clearing on both sides Flemsboen (Flemsbo) and Græslifald. Variation, $16\frac{1}{2}^{\circ}$ W.

11.—NORWAY.—*West Coast*.—*Lofoten Islands*.—*Glopen Light*.—*Alteration in Period of Exhibition*.—On 15th August, 1881, the following alteration will be made in the period of exhibition of the open light, south side of entrance to Sörvaag. It will be exhibited from 15th August to 30th April, instead of from 1st September to 14th April as hitherto.

12.—FRANCE.—*North Coast*.—*Havre*.—*Provisional Change in Position of Light on South Pier*.—During the process of destroying

and reconstructing the South pier of the port of Havre, a *fixed red light* which marks this pier is exhibited provisionally from the small platform on the western extremity of the sea breakwater, about 60 yards N. $87\frac{1}{2}^{\circ}$ E. from the position this light previously occupied.

213.—SPAIN.—*West Coast.*—*Vigo Bay.*—*Buoyage.*—Beacons.—At the beginning of April, 1881, the following buoys were in place marking shoals (steep-to) on each side of the channel, entering Vigo bay :—

On the *starboard* hand—(1) A *nun* buoy, painted black and surmounted by a white ball, is moored in $6\frac{1}{2}$ fathoms water on the outer edge of Rondaña shoal. (2) A *nun* buoy, painted black and surmounted by a white ball, is moored in $5\frac{1}{2}$ fathoms water on the outer edge of Cabo de Mar shoal. (3) A *can* buoy, painted red and white in vertical stripes, is moored in $5\frac{1}{2}$ fathoms water on the outer edge of Bouzas shoal.

On the *port* hand—(1) A *nun* buoy, painted black and surmounted by a white ball, is moored in $4\frac{1}{2}$ fathoms water, on the outer edge of Los Castros shoal. (2) A *bell* buoy, boat-shaped, painted black, surmounted by a staff painted red with a white ball, is moored in $5\frac{1}{2}$ fathoms water, on the outer edge of Borneiro shoal. (3) A buoy, painted red and white in horizontal bands, and surmounted by a white ball, is moored in $5\frac{1}{2}$ fathoms water on the outer edge of Zalgueiron rock. (4) A buoy, painted black and white in horizontal bands, and surmounted by a white ball, is moored in $5\frac{1}{2}$ fathoms water, on the outer edge of Rodeiro shoal.

Also, a beacon, consisting of an iron bar with cross-pieces painted red and white, is placed in 5 feet water on Pegueiro rock. *Variation*, $17\frac{1}{2}^{\circ}$ W.

214.—MEDITERRANEAN.—*Tripoli.*—*Lights at Cape Kartil-al-Mosin, near Homs, and Ras Misratah.*—On and after 30th April, 1881, a *fixed white light*, elevated 85 feet above the sea and 16 miles, would be exhibited at about 273 yards from the extremity of cape Kartil-al-Mosin, near port Ligatah (between capes Ras-Ashan and Lebidah; position given by lat. $32^{\circ} 40' 30''$ N., long. $14^{\circ} 12' 48''$ E. Also, a *revolving white light* showing a *flash* every 15 seconds, elevated 138 feet above the sea.

sea, and visible 18 miles, would be shown from the extreme point of cape Ras Misratah; position given, lat. $32^{\circ} 25' 15''$ N., long. $15^{\circ} 9' 45''$ E.

215.—MEDITERRANEAN.—*Greece.*—*Gulf of Corinth.*—*Torpedo Ground.*—Torpedoes have been laid down for exercise in the gulf of Corinth, between Rhio and Antirhio; commanders of vessels therefore entering the gulf of Corinth, must take a pilot at Patras; addressing themselves to the harbour master at that place; vessels leaving should discharge their pilots at Patras.

216.—MEDITERRANEAN.—*Candia or Crete.*—*Suda Bay.*—*Northern Entrance barred by Chain Cable.*—Authorities in Crete have caused a chain cable to be extended from the northern shore of the entrance to Suda bay to the islet opposite (Suda), in order to bar the passage of vessels. The southern entrance—between Suda islet and the south shore of the bay (Suda point), which is generally used, is free.

217.—MEDITERRANEAN.—*Dardanelles.*—*Regulations Prohibiting Passage at night strictly enforced.*—The regulation prohibiting vessels from passing up the Dardanelles during the night is now strictly enforced by the Turkish Government, and vessels attempting to infringe it have recently been fired at with shotted guns. Mariners are warned accordingly.

Note.—Vessels entering the Dardanelles at night may proceed as far as the anchorages below the Inner castles (Sultanieh Kalehisi and Kilid Bahr), but not farther between sunset and sunrise.

218.—NORTH ATLANTIC.—*Cape Verde Island.*—*St. Jago Island.*—*Porto Praya.*—(1.) *Light on Punta Temerosa.*—To be exhibited in May, 1881, from a lighthouse erected on Punta Temerosa (Temeroya), western entrance point of Porto Praya, south side of St. Jago island, as a guide to vessels entering the port. It will be a fixed white light, elevated 85 feet above high water (54 feet above the ground), and visible from a distance of 13 to 15 miles. The lighthouse, constructed of stone and octagonal in shape, is painted white, as is also the keeper's dwelling. Position on Admiralty chart, lat. $14^{\circ} 53' 15''$ N., long. $23^{\circ} 31' 0''$ W. (2.)—*Provisional Light on New Pier.*—Exhibited from an iron pedestal in the centre of the extremity of the new pier (Infanta D.

Henriques), at Porto Praya. It is a *fixed red* light, elevated 23 feet above high water (15 feet above staging of the pier), and visible from a distance of 3 miles.

219.—NORTH ATLANTIC.—*Cape Verde Islands.*—*Fogo Island.*—*Luz (St. Philip).*—*Light at Fort Carlotta.*—Exhibited in April, 1881, from an iron column near fort Carlotta, west side of Fogo island. It is a *fixed red* light, elevated 116 feet above high water (10 feet above the ground), and visible from a distance of about 3 miles. Position approximate on Admiralty chart, lat. $14^{\circ} 52' 15''$ N., long. $24^{\circ} 30' 30''$ W. This light is intended as a guide to the anchorages (northward and southward of the light) off the town of St. Philip, known respectively by the names of "Port of the Town," and "Port of our Lady." The Port of the Town anchorage is used during the period of strong winds—from November to June; the Port of our Lady during the rainy season—from June to October. These anchorages are taken up respectively dependent on the shifting of sand banks under the influence of the two seasons.

220.—NORTH ATLANTIC.—*Cape Verde Islands.*—*Brava Island.*—*Furna Cove.*—*Light on Jalunga Point.*—Exhibited in April, 1881, from an iron column on Jalunga Point, at the entrance to Furna cove, east side of Brava island. It is a *fixed red* light, elevated 50 feet above high water (10 feet above the ground), and visible from a distance of about 3 miles. Position approximate on Admiralty chart, lat. $14^{\circ} 50' 30''$ N., long. $24^{\circ} 40' 15''$ W.

221. AFRICA.—*West Coast.*—*St. Paul de Loando Harbour.*—(1.) *Particulars of Cape Lagosta Light.*—With reference to previous Notice, this light (fixed, with flashes every two minutes), is elevated 210 feet above high water, and should be visible from a distance of 24 miles. Position approximate, lat. $8^{\circ} 45\frac{1}{2}'$ S., long. $13^{\circ} 17\frac{1}{2}'$ E.

(2.) *Position of Beacon.*—With reference to the beacon north-
1881, 16 miles of the farm of Boa Vista, St. Paul de Loando harbour, at
extremity about 600 yards N.E. by E. of the Quinta, and when
between capes with the centre of fort San Pedro bearing S. by E. $\pm$
 $32^{\circ} 40' 30''$ N., 1 miles westward of Loando reef light-vessel, and
showing a flash clear of the north-east edge of Loando reef.

Vessels entering the harbour with these leading marks in line, may haul up for the anchorage when fort San Miguel is seen well open of the north-east point of Loando island. Variation, 20° W.

222.—INDIAN OCEAN.—*Gulf of 'Omán.*—*Cape Jāshak.*—*Clearing Marks for Telegraph Cables.*—In order to avoid fouling the telegraph cables on the eastern side of cape Jāshak (Jashk), eastern side of entrance to Persian gulf, vessels should not anchor westward of the following line:—Small beacon near the cable house in line with the station flagstaff.

223.—INDIA.—*West Coast.*—*Bombay.*—*Leading Beacons for Clearing the S.W. Prong, Kolaba.*—A tower, 80 feet high and painted black, has been erected on the North Pap (Ashwera hill), Bombay harbour; when kept in line with the white beacon on Hull knob (Kalegaum hill) it leads clear of the south-west prong, Kolaba.

224.—INDIA.—*Gulf of Manar.*—*Paumben Pass.*—*Range of Visibility of Paumben Light.*—With references to Notice 189, 492, relative to the diminished range of visibility of Paumben light. The repairs to the light have been executed and it is now visible from a distance of 14 miles.

225.—INDIA.—*Bay of Bengal.*—*Madras.*—*Removal of North Buoy, Harbour Entrance.*—The North buoy, entrance to Madras harbour, has been finally removed.

226.—EASTERN ARCHIPELAGO.—*Strait of Macassar.*—*Macassar.*—*Reef Reported S.S.E. of Lankai Islet.*—This reef (Johan Theodor), on which the Dutch barque *Johan Theodor* struck, is stated to lie with the following bearings, viz.:—Lankai islet, N.W.; Hertenbeest islet, E. by S. $\frac{1}{2}$ S. These bearings assuming the bearing E. by S. $\frac{1}{2}$ S. to refer to Great Deer islet) place the reef in approximately, lat. $5^{\circ} 6' 15''$ S., long. $119^{\circ} 3' 45''$ E. Variation, $1\frac{1}{4}^{\circ}$ E.

227.—JAPAN.—*Kiusiu.*—*West Coast.*—*Nagasaki Harbour.*—*Light on Kageno Sima.*—On March 1, 1881, a light was exhibited from a lighthouse erected on the north point of Kageno Sima, south side of entrance to Nagasaki harbour. It is a *fixed red* light, visible between the bearings of S. $77\frac{1}{2}^{\circ}$ E. (through south) and N. $51\frac{1}{2}^{\circ}$ W.; elevated 40 feet above the sea, and visible from a distance

of 8 miles. The lighthouse, 16 feet high, is constructed of stone. Position, lat. $32^{\circ} 42' 40''$ N., long. $129^{\circ} 49' 20''$ E. Variation, 4° W.

228.—SOUTH AUSTRALIA.—*Spencer Gulf*.—*Deepening operations at Port Pirie*.—The channel of the outer bar at port Pirie is now 280 feet wide, and has a clear depth of not less than 10 feet at low water spring tides.

229.—WEST INDIES.—*British Honduras*.—*Belize*.—*Particulars of Mauger Cay Lights*.—These lights (fixed triangular) are exhibited on Mauger Cay, Turneffe islands, approach to Belize. Beyond a distance of 4 to 6 miles, the lights show as one light, but within that distance three distinct lights are visible between the bearings of west and south. In a north-west and south-east direction, the lights are in line and appear as one light. The lighthouse is painted white. Variation, 6° E.

230.—WEST INDIES.—*Cuba*.—*South Coast*.—*Port Guantánamo*.—*Harbour Lights on Mole*.—A lantern-light is exhibited on each of the two angles of the mole head at port Guantánamo, or Cumberland harbour:—The lights are elevated 16 feet above the sea. One lantern has two *white* and two *red* glasses; the other two *white* and two *green* glasses, the coloured glasses being turned towards the bay; the red light marks the northern, and the green light the southern angle, thus indicating the sides as well as the head of the mole. Position approximate, lat. $20^{\circ} 1'$ N., long. $75^{\circ} 16'$ W.

231.—UNITED STATES.—*Virginia*.—*York River*.—*Light on Bell's Rock*.—On and after May 20, 1881, a *fixed white* light will be shown from the lighthouse recently erected on Bell's rock; the apparatus lights 270° of the horizon, and is $45\frac{1}{2}$ feet above mean low water. The structure is hexagonal in form, and stands on iron piles in 10 feet of water; the roof and foundation are brown, the superstructure white, and the lantern red. During thick and foggy weather, a bell struck by machinery will be sounded at intervals of 15 seconds.

232.—CANADA.—*Prince Edward Island*.—*South Coast*.—*Charlottetown*.—*Light on St. Peter Island*.—On the opening of navigation in 1881, a light would be exhibited from a lighthouse

erected on the western point of St. Peter island, west side of entrance to Charlottetown harbour, Hilsborough bay. It will be a *fixed white* light, elevated 46 feet above high water, and visible from a distance of 12 miles. The lighthouse, 38 feet high, is constructed of wood, square in shape and white in colour. Position, lat. $46^{\circ} 7' 10''$ N., long. $63^{\circ} 11' 40''$ W.

233.—CANADA.—Prince Edward Island.—North-East Coast.—*Tignish River Entrance.—Leading Lights Discontinued, Fixed Light Exhibited.*—The leading lights have been discontinued, and in lieu thereof, on the opening of navigation in 1881, a light would be exhibited from a lighthouse erected on the beach at the inner end of the north breakwater pier. It will be a *fixed white* light, elevated 35 feet above high water, and visible seaward from a distance of 11 miles. The lighthouse, 33 feet high, is square in shape, and painted white, with a black horizontal band round the middle. Position, lat. $46^{\circ} 57' 35''$ N., long. $63^{\circ} 59' 20''$ W.

OUR OFFICIAL LOG.

OFFICIAL INQUIRIES AT HOME, 1881.

1005. *Eothen*, brig; built at Cardiff, 1849; owned by Mr. A. Morrison and another; tonnage, 225; Middlesbrough to Sydney; pig iron; stranded at Sandy Haven, Milford, March 3, 1881. Inquiry held at Swansea, May 9, 1881, before Fowler, Judge; White, Hight and Ward, N.A. Master in default for running vessel aground without sufficient cause and for wilful negligence. Certificate cancelled.

1007. *Alne Holme*, s.s.; built at Sunderland, 1876; owned by Mr. W. Hine; tonnage, 657; Newport to Vigo; coals; sustained material damage from an explosion which took place off Vigo, February 27, 1881, when loss of life ensued. Inquiry held at Liverpool, May 9, 1881, before Raffles, Stip. Mag.; Aplin, Forster and Cowie, N.A. Casualty caused by an explosion of coal-gas in consequence of deficient ventilation. Owners ordered to pay £100 towards expenses of inquiry.

1012. *Jeanie*, s.s.; built at Hartlepool, 1874; owned by Mr. J. Coverdale; tonnage, 918; Middlesbrough to Alexandria; railway chairs; lost near Cape Trafalgar, March 30, 1880. Inquiry held at Middlesbrough, May 9, 1881; before Coleman, Judge; Powell, Harris and Harland, N.A. Loss due to the master being misled by Cape Trafalgar light being seen as a fixed instead of a revolving light and mistaking it for Cape Spartel light.

1013. *Amazonense*, s.s.; built at Southampton, 1879; owned by Mr. R. Singlehurst; tonnage, 1,449; Liverpool to Para; general cargo and one passenger; lost near St. David's Head, April 16, 1881. Inquiry held at Liverpool, May 12, 1881, before Raffles, Stip. Mag.; Wilson and French, N.A. Master to blame for steering too southerly a course and for running at too high a rate of speed in a dense fog. Certificate suspended for three months.

1014. *Mary*, brig, and *Rowland*, s.s.; the former built at Alloa, 1845; owned by Mr. W. Frankland; tonnage, 181; Newcastle to Dover; coals; the latter built on the Tyne, 1878; owned by Mr. R. Mawson; London to Penarth Roads; ballast; in collision in the Downs when the *Mary* foundered. Inquiry held at Cardiff, May 13, 1881, before Jones, Judge; Clarke and Anderson, N.A. Accident caused by an inefficient look-out having been kept on board the steamer, for which the master was responsible. Certificate suspended for three months.

1016. *Miss Thomas*, schooner; built at Nevin, 1864; owned by Mr. H. Lloyd; tonnage, 127; St. Louis to Algiers; cement; stranded on Cape St. Mary, Portugal, March 11, 1881. Inquiry held at Liverpool, May 19, 1881, before Raffles, Stip. Mag.; Wilson and French, N.A. Casualty due to careless and inattentive navigation on the part of the master. Certificate suspended for three months.

1017. *Woodlands*, barquentine; built at Passage West, 1877; owned by Mr. R. Foley; tonnage, 396; New York to Gloucester; grain in bulk; abandoned at sea, April 15, 1881. Inquiry held at Cork, May 20, 1881, before Mitchell, Judge; Forster and Castle, N.A. Abandonment justifiable.

1018. *Speed*, schooner; *Solent*, s.s.; the former built at Cardiff, 1863; owned by Mr. W. Dallorgo; tonnage, 51;

Runcorn to Jersey; salt; the latter built at Sunderland, 1870; owned by Mr. J. L. Hill; tonnage, 462; Southampton to Cardiff; water ballast; in collision near the Longships, April 3, 1881, when loss of life ensued, and the schooner founded. Inquiry held at Cardiff, May 18, 1881, before Jones, Judge; Grant, Clarke and Anderson, N.A. Master of the *Solent* in default for keeping an inefficient look out. Certificate suspended for twelve months.

1020. *Osprey*, cutter; *Snæfell*, s.s.; the former built at Ringsend, 1866; owned by Mr. R. Wright; tonnage, 41; on a fishing cruise; the latter built at Greenock, 1876; owned by Mr. W. Gell; tonnage, 395; Liverpool to Isle of Man; passengers; in collision fourteen miles off Douglas, Isle of Man. Inquiry held at Liverpool, May 21, 1881, before Raffles, Stip. Mag.; Wilson and French, N.A. Master of *Snæfell* in fault for navigating at too high a speed in thick weather. Admonished to be more careful in future.

1021. *Glenaros*, ship; built at Sunderland, 1861; owned by Mr. M. Owen; tonnage, 679; Philadelphia to Queenstown; boat; abandoned at sea. Inquiry held at Westminster, May 14, 1881, before Rothery, Wreck Commissioner; Burney, Forster and Castle, N.A. Casualty due to the vessel's weak condition, which caused her to leak in heavy weather. Abandonment justifiable.

1022. *Mispah*, s.s.; built at Sunderland, 1869; owned by Mr. G. P. Forwood; tonnage, 727; Liverpool to the Baltic; General cargo; lost on Old Skaw, Jutland, April 20, 1881, when loss of life ensued. Inquiry held at Liverpool, May 24, 1881, before Raffles, Judge; Burney, Beasley and Comyn, N.A. Accident due to master having overestimated the distance run, and shaping his course to the S.E. too soon, owing to strength of current.

1024. *Kestrel*, s.s.; built at Dundee, 1878; owned by General Steam Navigation Company; tonnage, 615; London to Bordeaux; cargo and passengers; stranded on Burhou Island, April 15, 1881. Inquiry held at Westminster, May 25, 1881, before Rothery, Wreck Commissioner; Hight and Methven, N.A. Accident due to negligent navigation on the part of the master in setting a

course from Royal Sovereign Lightship, so as to pass too near Caskets, and thus bringing his vessel within the range of Race of Alderney. Certificate suspended for three months.

1026. *Matheran*, schooner, and *Labarrouère*, s.s.; the former built at Salcombe, 1874; owned by Mr. W. R. Beer and others; tonnage, 110; Caen to Newport (Mon.); ballast; and the latter built at Jarrow, 1880; owned by the Larbarrouère Steamship Company; tonnage, 772; Cardiff to St. Nazaire; coals; collision near Sully Point, Bristol Channel, April 18, 1881. Inquiry held at Cardiff, May 24, 1881, before Jones, Judge; Curling and Harland, N.A. Collision caused by the steamer's steering gear of the steamer becoming and rendering the vessel unmanageable.

1027. *Culmore*, s.s.; built at Seacombe, 1874; owned by E. Paull and another; tonnage, 337; Valencia to Liverpool, oranges, &c.; lost near Bishop Light, May 7, 1881, when loss of life ensued. Inquiry held at Liverpool, May 26, 1881, before Raffles, Judge; Burney, Beasley and Comyn, N.A. Loss caused by an error in the navigation. Master drowned.

1029. *Nautilus*; built at Sunderland, 1842; owned by Mr. Whitfield; tonnage, 268; Sunderland to Stockholm; coals, &c.; lost on Brandsten Rock, Sando Channel, May 14, 1881. Inquiry held at Sunderland, June 4, 1881, before Booth and Wier, Judges; Harris and Ward, N.A. Loss caused by the absence of any buoy or beacon to indicate the danger.

1032. *Phoebe Lewis*, schooner; built at Porthcawl, 1874; owned by Mr. E. Lewis; tonnage, 99; Newport to Gijon; sugar, rails, &c.; abandoned at sea, April 1, 1881. Inquiry held at Cardiff, June 2, 1881, before Jones, Judge; Forster and Castle, N.A. Casualty due to the vessel being overladen and improperly stowed. Master responsible. Certificate suspended for six months.

OFFICIAL INQUIRIES ABROAD, 1880-1.

1003. *Mary*, schooner; stranded at Lockville, June 5, 1879. Inquiry held at Vasse, June 9, 1879. No blame attached to master.

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1004. *Ella Beatrice*, ship; lost at Juisan Mura, Japan, February 7, 1881. Naval Court held at Kanagawa, March 16, 1881. Master to blame for neglecting use of lead. Certificate suspended for twelve months.

1006. *Albion*, s.s., and *Isabella Pratt*, schooner; in collision off Port Charles, February 22, 1881. Inquiry held at Auckland, N.Z., February 26, 1881. Accident caused by the schooner having become obscured in the steamer's smoke.

1008. *Lyttelton* s.s., and *Aspasia*, schooner; in collision in Lyttelton harbour, February 27, 1881. Inquiry held at Lyttelton, N.Z., March 3, 1881. Blame due to both vessels. Costs of inquiry divided.

1009. *Clematis*, brig; lost off Banks Peninsular, February 21, 1881. Inquiry held at Lyttelton, N.Z., February 25, 1881. Accident caused by an error of judgment on the master's part.

1010. *Kina*, s.s., and *Ellen Curran*, cutter; in collision in the Wartemata river, December 1, 1880. Inquiry held at Auckland, N.Z., December 23, 1880. Master of steamer to blame. Certificate suspended for six months.

1011. *Amity*, barque; lost on Little Inagua Point, March 29, 1881. Inquiry held at Nassau, April 11, 1881. Casualty due to a strong westerly current.

1015. *Fairy Queen*, brig; lost on a reef near Cape St. Sebastian, December 17, 1880. Inquiry held by the Mauritius Marine Board, January 25, 1881. Casualty due to want of local knowledge on the part of the master.

1019. *Hilda*, s.s., and *Evangelistria*, schooner; in collision at sea, May 6, 1881, when the schooner foundered. Inquiry held at Malta, May 11, 1881. Mate of steamer to blame for leaving the bridge during his watch on deck. Certificate suspended for three months.

1023. *Belsize*, s.s.; abandoned at sea, April 15, 1881. Naval Court held at New York, May 9, 1881. Loss due to the vessel being overladen.

1028. *W. J. Stairs*, barque, and *S. Forbin*, brigantine; in collision at sea, April 30, 1881. Naval Court held at Baltimore. Collision unavoidable. Masters free from blame.

1080. *Felicity*, brig; lost near the Scaw. Naval Court held at Copenhagen. Master guilty of negligence; reprimanded.

1081. *Silver Cloud*, schooner; stranded at the entrance of Napier Harbour, January 26, 1881. Inquiry held at Napier, N.Z., March 28, 1881. Master free from blame.

1083. *Gresham*, s.s.; lost at New Orleans whilst being moved from the loading berth into the stream. Pilot to blame.

1084. *Waitara*, ship; stranded on Triangle Rocks, Bluff Harbour, March 11, 1881. Inquiry held at Dunedin, N.Z., March 23, 1881. Master exonerated.

1085. *Mohaka*, s.s.; damaged by being bilged, March 4, 1881. Inquiry held at Blenheim, N.Z., March 11, 1881. Mate responsible for damage. Certificate suspended during Governor's pleasure.

1086. *Aethelred*, barque; abandoned at sea after collision with another vessel off Cape Horn, March 29, 1881. Naval Court held at Talcahuano, April 22, 1881. Abandonment justifiable.

1087. *Indus*, barque; stranded and subsequently burnt on San Carlos Reefs, Cuba, May 7, 1881. Naval Court held at Havana, May 23, 1881. Stranding due to an error in judgment on part of master. Fire accidental.

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OUR SEAMARKS.

INTRODUCTION.

NDER the influences of frost, heat, rain, floods, rivers, tides, currents, and the fierce action of tempest-tossed waters, the configuration of our coast line is ever slowly but surely changing, and while in one place the land is worn gradually away, in another little by little it is added to. The hardest rock as well as the most friable soil yields sooner or later to the erosive action, although naturally the former holds out much longer against the attack. As a result of this general crumbling away of the shores it is obvious that the sea receives continually a vast quantity of earthy matter—matter which may remain in solution so long as the movement of the water is sufficiently rapid and strong to prevent it falling to the bottom as sediment. Again great rivers having a rapid flow carry with their hurrying waters large stores of earth obtained from the land through which they have taken their course, but when the stream mingles with the broad waters of the ocean its rapid flow ceases and the suspended matter falls on to the bed of the sea. Sometimes the strength of the stream is so great as to carry the suspended matter to great distances from the coast, where it may become subject to the influence of ocean currents, and be carried in a

different direction to be deposited far from the shore, or the set of the tide may be so strong as still to prevent it from being deposited on the sea-bed, and it may at last even be carried back to another part of the coast by the flowing tide, and left in ridges on the shore as the tide recedes. Again in stormy weather when huge waves break upon a soft shore the water becomes charged with sand or mud which also may be carried out with the ebbing tide until it reaches a less turbulent locality where it sinks. These deposits have always been going on near the coast, and in time have formed shoal banks of sand or mud, on which many a ship has laid bare her bones and many a valuable life has been cast away. But not only is the gradual formation of such shoals always going on near our coast but those already formed are exposed to influences which make them liable to constant change, the scouring effect of a rapid tideway, or current in a narrow channel, eats into and undermines the banks on either side, washing away to other parts great quantities of the sand or mud of which the banks are composed and in time altering their shape and by consequence altering the form of the channels through which vessels are navigated.

But equally as treacherous are the rocky ribs of earth, which unlike the crumbling soil fringing many parts of the coast, are not liable to shift and change within the experience of a generation, and in spite of the action of waves, tides and currents, remain to all appearances steadfast and immovable. In most cases rocks near the coast may be regarded as the ragged remnants of the shores of ancient days, they are either scattered about here and there in the sea not far from land, or they may be the projecting points of long low reefs running out to sea from a rock-bound coast. Occasionally isolated rocks are to be found in the deep water of mid-ocean, but in such cases they are the summits of rocky mountains springing up from broad bases in the ocean plains.

Ever since man has attempted to voyage across the sea these rocks and shoals in the vicinity of land have seriously threatened his safety and too often have proved the cause of disastrous shipwrecks; indeed a much greater number of shipping casualties occur near shore than in mid-ocean. Consequently, from the

earliest times, efforts have been made to assist mariners to reach their ports in safety, by pointing out where these dangers are situated and how they may be avoided.

The principal shoals and sandbanks around the British coasts are those formed at the mouths of the Rivers Thames, Mersey, Humber, Tees, and Severn, and those established by the action of tides and currents off the Eastern Counties of England known generally as the Yarmouth Sands, the notorious Goodwins, and the extensive sandbanks off the East Coast of Ireland. These sands are usually intersected by deep water channels, which, when the sands are covered at high water, are indistinguishable in the open expanse. Reefs and rocks are more frequent round the ironbound coast of Scotland, and on the West coasts of England and Ireland, although there are sundry dangerous rocks and reefs existing at other parts of the English coast, which have proved fatal to many ships and their crews.

It is by means of seamarks that the positions of these dangers are pointed out, and the safe channels marked; but they are also intended to serve another purpose. The mariner on approaching land from overseas calculates according to his reckoning where he ought to be, but his reckoning may be wrong, or his vessel may have been so driven by winds, tides, or currents, that he really is in doubt as to where he is. If nothing has occurred to disturb his reckoning he knows what part of the coast he ought to see first, and looks eagerly for some seamark by which he is able to confirm his calculations. But if he should have lost his reckoning and land should be reported, he then keenly scans the coast line until he sees some object by which he can identify the locality and so learn how to continue his voyage in safety.

In these days when sea traffic is so enormous, when thousands of vessels come to and sail from our ports, when the darkness of night is no hindrance to sea voyaging, and regardless of the opposing influences of wind and tide, gigantic steamers are continually hurrying across the ocean to and from all parts of the globe, freighted with human lives or valuable commodities, it is very evident that the necessity for effectual seamarks on all coasts for use both by day and by night is most urgent.

In the case of our own country it is specially important. Not only are we as a maritime nation bound to afford facilities for our own vessels to go from and return to our shores, but we must do all in our power to invite foreigners to visit us, and by instituting friendly relations with other countries, develop our own commerce and assist in that general inter-communication among nations which is the enemy of war and the promoter of the general good of the world. Inhospitable shores like inhospitable people do not invite visitors, but if the friendly hand of assistance "holding a lantern o'er the restless surge" be extended across the perilous waters which surround us, our neighbours, and even strangers afar off, will find the welcome an inducement to pay us frequent visits.

The seamarks employed on our coasts may be classed as follows :—

1. Lighthouses and unlighted beacons.
2. Light-vessels.
3. Buoys.
4. Fog-signals.

It is proposed in this series of papers to treat of each of these different kinds of seamarks, to describe what they are, and how they are made use of for marking dangers or for guiding purposes.

I.—LIGHTHOUSES.

The term "lighthouse" in itself supplies to some extent an explanation of what it is, but its purpose is not fully revealed in its name. It is a house specially adapted for showing a light, and it may be said that the *light* is intended to assist the seaman at night, and the *house* or *tower* to help him by day.

Out in the open sea the lights of heaven guide the mariner on his way. The flaming sun by day, the moon and the trembling stars by night are the blessed lights by whose aid he makes his voyage across the great deep. But near land these heavenly luminaries are insufficient guides, and when darkness envelops both sea and land, the seaman wants some earthly lights to show him where and how the land lies, and to enable him to navigate his vessel safely among the sandbanks and rocks to which reference has already been made.

The practice of the ancients in regard to setting up light-towers is wrapped in some obscurity. Here and there in the works of the old writers brief references may be found to the aid rendered to mariners by beacon fires at night and landmarks by day, and ingenious commentators have found a number of possible references to seamarks in connection with noteworthy pillars and other structures set up near the sea, but no verified details are forthcoming as to the special purpose of any such reputed landmark. The only indisputable fact which one gathers from the references to such matters by early writers is that navigation in their time being in a very crude condition, the necessity for guiding and warning signals had not made itself specially manifest. There is no trace of anything like systematic exhibition of lights at night, and if any such means were resorted to the practice is wrapped in historical obscurity. It would be of no value to weary the reader with an account of the vague surmises and speculative theories which have found expression in the works of many writers on the subject of lighthouses, the purpose of the author being rather to give a plain and practical explanation of why seamarks are necessary, and how the desired object is achieved by the arrangements in operation at the present time. We shall therefore leave to antiquarians and others interested in the matter the historical account and determination of the purposes of such structures as the Pharos of Alexandria, the Colossus of Rhodes, Cæsar's Altar at Dover, together with sundry other alleged beacon towers in different parts of Europe, and deal with those periods and places which are within the grasp of actual knowledge.

During the reigns of King Henry VIII. and Queen Elizabeth, British commerce and shipping grew considerably, and it became necessary that something should be done to assist mariners in approaching and leaving our shores.

In the year 1536, Henry VIII. granted a charter to a maritime society known as the Trinity House of Newcastle-upon-Tyne, incorporating them and giving them certain privileges. One provision of this charter is that they "may found, build, make and frame of stone, lime and sand, by the best ways and means

which they know or can, two towers, one to wit in the northern part of the Shelys (Shields) at the entrance of the port of the said town, and the other upon a hill there fit and convenient for signals, meets and bounds for the safe and secure custody of the town and port aforesaid, and also of our subjects and others being in our alliance coming to the said town and port * * * and that * * * for the maintenance of the said towers at the port aforesaid with a perpetual light to be nightly maintained may receive certain tolls, &c.

Again by the Act of Parliament of 8 Elizabeth, the matter seems to have been more generally dealt with, the preamble stating thus:—"Forasmuch as by the destroying and taking away of certain steeples, woods and other marks standing upon the main shores adjoining to the sea coasts of this realm of England and Wales, being as beacons and marks of ancient time accustomed for seafaring men, to save and keep them and the ships in their charge from sundry dangers thereto incident, divers ships with their goods and merchandizes in sailing from foreign parts towards this realm of England and Wales, and specially to the port and river of Thames, have by the lack of such marks of late years been miscarried, perished and lost in the sea to the great detriment and hurt of the common weal and the perishing of no small number of people." . . .

Here we have the earliest official references to seamarks on our coasts, but the nature of the allusions shows that at the periods in question, the use of coast-lights was but little known in this country. Mariners had navigated their vessels to and from our shores, chiefly by the aid of such seamarks as nature had provided in the distinctive features of the coast-line, or by churches, castles, or other prominent buildings visible from the sea, and although there are vague references by various authors to the existence of small lights for the better guidance of seamen into our harbours, it does not appear that the subject became one of national importance until the period now referred to, and certainly such lights as are alluded to were shown for merely local purposes, and not for the general advantage of passing ships.

The beginning of the following (the seventeenth) century saw

several towers set up on the coast for the purpose of showing lights therefrom to assist navigation. Of the structures so set up there are but few remains, and very scanty record as to what they were. We only know in a general way that they were simple, massive towers, and that huge fires of wood or coal were kindled on the tops. Under the name of fire-towers, structures of this kind had been in existence in the Mediterranean for a long period antecedent; but they were used only at the entrances of ports and harbours to guide ships in. The use of such blazing beacons was gradually extended as the years rolled on, and as mariners found an increased need for them. We may be sure that such beacon fires were not kept up without continual watchfulness and labour. There must necessarily have been much uncertainty in regard to a fire of this kind; at one moment vigorously blazing, then a mere mass of red-hot coal, again with a supply of fresh fuel giving off thick clouds of smoke and no light, and with a strong wind, heavy rain, or snow-storm, in danger of being altogether extinguished. These fluctuations would render such a light so uncertain that when a mariner most wanted to see it it might not be visible to him. Think, too, of the enormous consumption of fuel, the labour of carrying it to the top of the tower and of feeding the fire, and the exposure to heat and weather to which the attendant must have been subject. But, in addition to all this, the light would be weak, not able to send its rays any distance out to sea, and much of it would be wasted by going up into the sky where it could be of but little use to assist the mariner.

It is by the light of modern knowledge that we are enabled to criticise this crude and imperfect system; the present arrangements, as will be seen, offering so striking a contrast with those of the period just referred to. For nearly two hundred years these bonfires blazed with burning wood or coal; the only improvements being that some of the fires were closed in with bars and made to present a bright side to the sea, while the landward side was screened. It has also been said that a flat plate of rough brass on the landward side of a coal-fire was used as a reflector; but on this point no details are obtainable. Candles were used in some lighthouses at an early period; in Rudyerd's tower on the

Eddystone, which existed from 1708 to 1755, the light was maintained with twenty-four candles of three to the pound. There must have been much inconvenience in the use of the candles those days, for we find they were frequently discarded in favour of coal-fires, and more recently by oil. But whether candles, coal, or wood were the illuminating agent, uncertainty and very limited efficiency marked the system, and the lights could only be serviceable to mariners creeping anxiously along the coast as close in as it was safe to go. This may be taken as the condition of things during the whole of the seventeenth and nearly to the end of the eighteenth century. It is true that the number of lighthouses increased round the coasts; but their smoky, ill-burning flames were felt to be very defective and insufficient for guiding purposes at any distance. In those days navigation was, in a general way, carried on slowly and cautiously; night voyaging was the exception when near land, so the want of brilliant and powerful lights was probably not keenly felt. To reach the days when wood, coals, and candles became things of the past, and the results of scientific knowledge began to be utilised for the improvement of coast lights, we must transport ourselves to the beginning of the present century. By the invention of the argand burner, in the latter part of the last century, a very remarkable improvement in lighthouses was introduced; and again in the early part of the present century the construction of lenticular apparatus on the principle of Fresnel's celebrated invention, offered another means of greatly improving the lights. To both of these improvements we shall make detailed reference elsewhere, but we mention them now to mark two important epochs in lighthouse illumination.

The preceding remarks will probably afford sufficient information concerning the early condition of lighthouses to enable the reader to understand the objects and growth of the system. We will therefore proceed at once to the consideration of lighthouses as they now are.

(To be continued.)

PRELIMINARY INQUIRIES INTO WRECKS.

A DISCUSSION took place during the progress of the inquiry into the stranding of the *Engadine* which seems to show that the limit and extent of the power conferred by the Merchant Shipping Acts on certain persons to make preliminary inquiry into wrecks and casualties, is not fully understood by the persons who are most deeply concerned in the matter.

The s.s. *Engadine* stranded on the rocks inside Ushant, and having got off was taken to Brest, where the master furnished the British Consul with particulars of the stranding. These particulars were not confirmed on oath, nor signed by the master, but they seem to have been sufficiently detailed to enable the Board of Trade to decide as to the necessity for formal inquiry, for no further evidence appears to have been obtained before inquiry was ordered.

When therefore the Solicitor for the Board of Trade, directed his agent to obtain the statement of the master "for the purposes of his brief to Counsel" he was met with a refusal on something like the following grounds :

1. That sec. 432 of the Merchant Shipping Act, empowered the Board of Trade to appoint any person to make preliminary inquiry, and that the Consul at Brest was so appointed and had made the inquiry contemplated.

2. That the agent (as such) of the Solicitor to the Board of Trade, is not empowered by any Act of Parliament to require or enforce statements.

3. That the Board of Trade having ordered formal inquiry, had taken the matter out of the preliminary stage, and could not revert to it.

Whilst admiring the ingenuity of all the foregoing objections, and admitting the validity of the second and third, we cannot forbear expressing regret at the legal and technical quibbles which appear to be gradually surrounding these wreck inquiries. It seems to be wrongly assumed that the Board of Trade Solicitor is partisan, and proceeding only with a view to the punishment of

somebody, and not with a view to the thorough and im- investigation of the case, which should be all the more satisf- if it ended in the exculpation of everybody. We have no- that it is in this spirit that the Board of Trade Solicitor i- masters and officers to make statements for the purposes. brief to Counsel, and we fail to see why the Wreck Commis- designates the candid avowal of the Board's Solicitor as " very happy " expression. So long as the Solicitor's statemen- "true," it is, we think, of no moment that it was not "ha- The "true" are not always "happy" in their statements, a- a broad matter of fact, "untruth" does not in all cases neces- make the utterer of it "unhappy." But, to go from gener- to particulars, it must be remembered that Mr. Murton h- legal right to demand statements, and that his only possible- in inviting the master of the *Engadine* to make a statemen- the one indicated in his letter, and could not truthfully be- wise described, and that the justification of seeking such a- ment is acknowledged at the end of the Wreck Commissi- somewhat discursive remarks, as follows:—"And, althoug- Court is disposed to agree with Mr. Snagge that the master on the whole, given his evidence in a straightforward w- cannot but regret that he had not the opportunity of giving, first instance, his own view of the case, as he is, obviousl- only person who can give a full explanation of the circumst- which led him to take the course he did; and it might, in some- although I cannot say that it has done so in this case, plac- in a disadvantageous position." We cannot, however, alto- agree in the above opinion, for the master had ample "o- tunity" of giving his view of the case in his log-book. B- return to the arguments of the legal advisers of the master- clear that they were fatal as against the Solicitor to the Bo- Trade, but it is equally clear that one at least of them was- and misleading as regards the general question of prelin- inquiries. It was wrong to say that the Consul was a p- appointed by the Board of Trade to make preliminary inq- under sec. 432, and it was also wrong to say that the parti- obtained by the Consul from the master constituted prelin-

inquiry under sec. 432. It is clearly laid down in the section already quoted that preliminary inquiries can only be held in respect of wrecks or casualties occurring abroad, "when witnesses arrive or are found at any place in the United Kingdom." It is, therefore, obvious that any examination made by a Consul at a foreign port could not supersede nor be the same as the preliminary inquiry contemplated by sec. 432, which must necessarily be held in the United Kingdom. It follows that a properly constituted officer under sec. 432 could have required evidence from the master on his arrival in the United Kingdom, but prior to the formal inquiry being ordered under sec. 432, notwithstanding the previous statement, formal or informal, which he had made before the Consul at Brest.

Apart, however, from the case of the *Engadine*, the question of preliminary inquiries and depositions is one of considerable interest, and the following observations may be useful to our readers.

The legal provisions for preliminary inquiries held in the United Kingdom are contained in secs. 432 and 448 of the Merchant Shipping Act, 1854, and sec. 32 of the Merchant Shipping Act, 1876.

Section 432 provides that it shall be lawful for the following officers, viz :—

1. Inspecting officers of Coastguard.
2. Principal officers of Customs.
3. Persons appointed by the Board of Trade for the purpose of making inquiry.

To make inquiry in the following cases, viz. :—

1. Whenever any ship is lost, abandoned, or materially damaged on or near the coasts of the United Kingdom.
2. Whenever any ship causes loss or material damage to any other ship on or near such coasts.
3. Whenever any such loss, abandonment, damage, or casualty happens elsewhere, and any competent witnesses arrive or are found at any place in the United Kingdom.

And for the purposes of the aforesaid inquiry, the authorized officer has all the powers of an inspector under the 14th and 15th

sections of the Act, that is to say, he may go on board the vessel and inspect equipments, &c., he may require the attendance of all such persons as he may think necessary, and may require from them answers to any inquiries he may think fit to make. He may require and enforce the production of all books, papers, or documents, or he may administer oaths or require every person examined to subscribe a declaration as to the truth of the statements made by him.

Any one refusing to give evidence or comply with any of the above requirements subjects himself to a penalty not exceeding ten pounds for each offence. The person summoned is however entitled to have his actual expenses (if any) tendered to him in cash before the penalty for default can be recovered. In order that the inquiry may be efficiently conducted, the principal officer of Customs is usually assisted by an officer of the Coastguard, and both officers receive fees from the Board of Trade if the work is done promptly and efficiently, but no fees or expenses are chargeable to the vessel or to the witnesses. The evidence is usually taken on oath on the Departmental Form, Inq. 1, and the report is made separately, or on the Form W. 1.

It will be observed, that sec. 432 does not provide for inquiry in any case in which life has not been lost, or the vessel materially damaged. The power of making preliminary inquiry was accordingly extended to the following cases by sec. 32 of Merchant Shipping Act, 1876 :—

1. Whenever any ship on or near the coasts of the United Kingdom, or any British ship elsewhere has been stranded or damaged, and any witness is found in the United Kingdom : or,

2. Whenever a British ship has been lost, or is supposed to have been lost, and any evidence can be obtained in the United Kingdom as to the circumstances under which she proceeded to sea, or was last heard of.

It seems doubtful, however, whether this section contemplated the appointment of a special officer for each inquiry, or whether the machinery provided by sec. 432 would be competent to make inquiry under the Act of 1876. The point is, however, immaterial.

Although secs. 432 (1874) and 32 (1876) provide for preliminary inquiry in every conceivable case of casualty to a British ship, excepting perhaps, damage to cargo alone, it does not provide for the publication of the evidence and the report of the inquiry officers. Copies of the evidence on Form Inq. 1, may, we understand, be obtained from the Board of Trade on payment of the copying charges, but the reports of the inquiring officers are regarded as privileged documents.

But in addition to the sections above quoted, there is sec. 448 which empowers Receivers of Wreck (generally the same persons as the Principal Officers of Customs), and Justices of the Peace to take depositions in regard to every vessel in distress on the coasts of the United Kingdom. The scope of this section is very narrow, as it is confined to vessels within three miles of our coasts or within the headlands, and it does not apply to rivers and harbours which by some strange anomaly are not supposed to be on the coasts. The object of the section is apparently of a notarial character, and seems to be chiefly with a view to the settlement of salvage and underwriting disputes; but it is difficult to see why its provisions if useful for anything, should be restricted to such a very narrow belt of the sea. It is also open to the objection that, whereas preliminary inquiry is held under sec. 432 without any expense to the vessel, fees and expenses sometimes amounting to several pounds are chargeable to vessels great or small coming within the range of the section. Furthermore, as the vessels affected are chiefly of a small coasting description, the hardship is intensified.

We do not know the amount of income derived from these deposition fees, or the amount saved to the Mercantile Marine Fund by recovering the expenses of receivers from wrecked property, but we do think that the perpetuation of the present anomalous system is unwise and vexatious, and that the charges in respect of depositions should be discontinued, or, on the other hand, that the application of the section should be greatly extended. Section 448 provides that copies of depositions should be sent to Lloyd's, to be posted for public inspection, and also to the Board of Trade, whilst the original documents are filed by

the Receivers of Wreck. On the other hand, the evidence obtained under sec. 432 is forwarded in original to the Board of Trade, in whose discretion it remains to give or withhold. The difference in the treatment of the evidence obtained under the above sections and the practice of charging fees in respect of depositions was at least intelligible whilst there existed a class of Receivers of Wreck who acted as notaries, were not wholly confined to the public service, and were paid by fees; but this class has almost died out, and the duty of making preliminary inquiries and taking depositions has fallen upon the collectors of Customs, under one or other of their numerous titles, we can see why the present puzzling and complex system should be simplified by the elimination of sec. 448 from the Statute, and by provision being made for the publication of evidence obtained under sec. 432. Such a re-arrangement would doubtless be welcomed by all classes interested in the Mercantile Marine.

It may be remarked that the evidence obtained under the above sections is almost identical, and that when depositions are taken under sec. 448 the evidence under sec. 432 is generally dispensed with.

We will take an early opportunity of returning to this subject for the purpose of pointing out what are, in our opinion, the main objects and uses of preliminary inquiries, and how the present system might be extended and improved.

THE LAW OF DAMAGES CAUSED BY COLLISIONS
AT SEA.

By F. W. RAIKES, M.A., L.L.M., OF THE INNER TEMPLE,
BARRISTER-AT-LAW.

(Continued from page 551, July No.)

(II.) *As to the Claim of The Admiralty Rule to Ubiquity.*

IT will be observed from the discussion in the House of Commons, which I have already referred to, that with one exception, that of Sir Watkin Williams, at present Justice of the High Court, there was an unanimity of opinion in favour of the Admiralty rule, but founded apparently in all cases on the supposed fact that that rule prevailed in all other countries. Seeing that view was held by one who has since occupied the chair of International Law in this university, by another who subsequently became Lord Chancellor of Ireland, and by a third who for some time after the debate in question and until his decease was one of the Lords of Appeal in Ordinary, I fear that it may be considered presumptuous on my part if I venture to differ from so great authorities. But I feel sure that in arguing a question of such importance I shall not meet the fate of that great jurist, Bynkershoek, when arguing before the Dutch Senate against the equal division of damages, *Memini me . . . de geometrica proportione perorante . . . senatores obstupuisse, at que si Jovis ignibus icti essent* (Bynk. Quæst. Jur. Priv. iv., 20).

The case which may be said to have established the law of equal division of damages where both vessels are to blame, both in this country and in Scotland, is that of *Hay v. Le Neve* A.D. 1824 (2 Shaw Sc. App. 395), which being a decision of the House of Lords does of course govern all other courts here as to any point of law which it decides, but though it has always been taken in recent days to rule that where both ships are to blame the damages are to be equally divided, yet the words of the judgment seem scarcely to bear out this proposition. On reference to the case it will be observed that the Scotch Court from which it was appealed had decided that

though both vessels were to blame, y more to one of the vessels than the oth portion of the damage, amounting to tw vessel most to blame, and one-third stating the law of Scotland to be t proportional to the guilt. Lord Giffar House of Lords does not seem to say tioning the loss was wrong in principle case before the House it did not app would in all cases be difficult. He says

(2 Shaws Scotch Appeal Cases 395, a I have the less difficulty in asking your l of equally apportioning the loss in this case, t seen, I think, that it would be extremely di the degree of negligence in the one and in t perhaps equally culpable."

And though it must be admitted that *Judith Randolph* in 1789, where though be most in fault the damages were equ case cited, the *Lord Melville* in 1816, that "when it (a collision) happened by parties, the ancient rule of the Admir considered a common loss," is capable o loss should be shared between them ei respective guilt or their respective value from the analogy of a common loss law creating a general average claim, app

It should be observed that the phrase the *Woodrop Sims* (2 Dod 83), and whic in *Hay v. Le Neve*, is, "That the l between them, as having been occasioned them." He does not say halved, though p are many,—in which though both are to decide who is most to blame, the result would pay half, yet in those in which th does not preclude another mode of appor remarked that in the case of the *Woodrop S* one of the vessels was held to be in

should be apportioned to the degree of culpability is clearly stated by Lord Campbell when in delivering the judgment of the Privy Council in the case of the *Friends* in 1844 (4 Moore P. C. at p. 322) he says, "The Court of Admiralty has the great advantage when both parties have been to blame of being able to apportion the loss according to their respective degrees of culpability." Shortly previous to this case Lord Denman had, whilst accepting the view of the equal division of damages, expressed his opinion against the justice of it, delivering judgment in the case of *De Vaux v. Salvador* (4 Ad. and Ell., 482) in 1836. He says:—

"It grows out of an arbitrary provision in the law of nations from views of general expediency, not as dictated by natural justice, nor (possibly) quite consistent with it."

It cannot, however, be disputed that for a considerable number of years before the passing of the Judicature Act, it had been the practice of the Admiralty Court to divide the damages equally between the two ships where both were to blame.*

I now propose to discuss whether that is the practice of any other nation at the present time. I have in an appendix (A) set out those portions of the codes of law in force in foreign States on this matter that I have been able to obtain.

Speaking generally, one group of nations has adopted the Commercial Code of France. These are, in addition to France herself, Belgium, Italy, and Greece; and another group, consisting of Sweden, Portugal, Holland, and Germany, has adopted with more or less modification the ancient maritime laws of Northern Europe.

* Questions may arise as to whether the enactment (S. C. J. Act, 1873, sec. 25, sub-sec. 9) has altogether, and in all cases substituted the Admiralty Rule for that of the Common Law. The clause provides only for "a collision between two ships," hence it may be argued not to apply when more than two vessels are in collision nor, there being no definition of a "ship" in the Judicature Act, to a collision between a ship and a boat; again the marginal note, which has been held to be part of the Act of Parliament (per Jessel M.R., *In re Venours Settled Estates*, 2 Ch. D. 522) confines its operation to "Collisions at Sea," i.e., to those cases in which the Court of Admiralty had original jurisdiction (*Overseers of Woolwich v. Robertson*, 6 Q.B.D. 654). Neither of these limitations to its scope have, however, been suggested in any case which has arisen since the Act was passed.

In the first group in those cases where both vessels are to blame the damage is proportioned to the amount of the blame, and is not except where the blame is equal, divided equally; in the second where both are to blame it rests where it falls, as the result of direct law; whilst in England alone are the damages equally divided irrespective of culpability.

The Commercial Code of France, governing the first group, does not, it is true, make any express provision for the case where both vessels are to blame, but for those only where from conflict of testimony or other reason the Court is not satisfied on which side the blame lies; or where in fact the accident is inevitable, a condition of things which in England would leave each ship to bear its own loss (the *Catharine of Dover*, 2 Hagg, 154; the *Nautilus*, Prit. Dig., p. 134 (P.C.); the *Maid of Auckland*, 6 Notes of Cases, 240). The article of the Code is commented upon by Paillet (*Manuel du Droit Français* Tome II., p. 117) as follows:—“This (article) appears to be obscurely expressed. It seems that every collision ought to be considered as a pure accident so long as it is not proved otherwise, and that consequently there can never be doubt in a legal sense as to the cause of a collision. But it may be quite certain that a collision is not the result of accident, and yet impossible to say which captain's fault caused it. This is probably the case of doubt of which it is the intention of the article to speak. In cases where a collision has taken place, it is necessary that the law should commence by establishing some sort of presumption as to its cause. And the most fitting presumption is that of accident.” For some time subsequent to the enactment of the Code it was no doubt considered that the result when both were to blame was that of our Common Law; the law being stated by *Pardessus* as follows:—*“S'il est prouvé qu'il y a faute des deux parts, chacun supporte sa perte (Pardessus, Cours de Dr. Comm.; par Tarlier, Vol. i., Pt. iv., Tit. ii., Chap. ii., Sec. iv.)*. But it has more recently been held in the French Courts that, “When two ships have come into collision, and it is proved that there has been a default on the part of both the captains, the two ships are liable for the damage in proportion to their respective defaults” (D.L., 1873-3-57; D.L., 1873-1-341; C.C., 1382); and that the “Art. 407 of the Com-

mercial Code does not provide expressly for this case"—both to same—"which ought therefore to be governed by general principles in respect of liability." This view of the law has moreover been very recently taken by the Court of Cassation at Paris in the case of a collision between a French and an English vessel, where The Court decided that when the evidence is sufficient to show that the collision has been the result of the co-existence of faults committed respectively by the two captains, the judge may, in accordance with the principles of responsibility, order the damage to be paid in proportion to the measure of the responsibility which falls on each of the parties; and that the Court of Rennes"—where the case had been taken on appeal from the Tribunal of Commerce of St. Malo—"in condemning the *Rance* to two-thirds of the loss and the *Dispatch* to one-third, only exercised its sovereign right to judge the circumstances, and made a proper application of the law" (Mit. Mar. Reg. 1880, p. 1459), and has also been adopted without demur in Belgium, where in a recent case before the Tribunal of Commerce at Antwerp, where both vessels were found to blame, "The Tribunal ordered that the damage to both vessels should be joined, and the two-thirds borne by the *Dania* and one-third by the *Alster*, costs to be shared in the same proportion." (Mit. Mar. Reg. 1880, p. 1460.)

I have been unable to obtain exact information as to the law in force in Russia, Denmark (see Appendix A., § 8), and Greece, but have reason to believe that in the two former it is the same as our Common Law and the other States of Northern Europe, and in the latter that it is identical with that of France and Belgium.

The law of Spain makes no provision for the case of both to blame, though the explanation of the Code (Appendix A., § 9) appears to tend to the inference that when both vessels are to blame, rather their captains, though as to each vessel and cargo combined the loss is borne where it falls, yet each captain is liable personally to his owners and the owners of the cargo on board his own ship, and the owners of the ship to the owners of the cargo on board it up to the value of the ship and freight.

There only remains one Code of Law on the subject to be mentioned. Egypt, it is true, does not possess any very large amount of

shipping of its own, but the Maritime Law of that country is of great interest to the whole of Europe for two reasons (1), because of the number of vessels under all flags which navigate the Suez Canal, and (2), because the Code is the most recent one, and has been made at the instance of those nations who appoint judges to administer it, and if not European may be considered as "*filius Europæ*."

It will be seen (Appendix A., § 12) that it embodies a method of division where both are to blame, unlike that of any single other nation, inasmuch as the damages are to be divided, not equally as in England, not in proportion to the guilt as in those nations ruled by the Commercial Code of Napoleon, nor are they to be borne by the person who has suffered them as in other nations, but they are divided in proportion to the *value* of the vessels.

I have dealt hitherto only with the nations on this side of the Atlantic, but the United States, adopting both our Common Law and that of our Admiralty as they found them at the time of their obtaining independence, have the same conflict of law still existing, though from the nature and extent of the Admiralty jurisdiction, collision cases but rarely come before a State Court (Ken. Com. 4th ed., Vol. i., part ii., Sec. xiv., p. 304; Vol. iii., Part v., Sec. xlvii., p. 231), and therefore, speaking generally, the Admiralty rule of dividing the damages equally is observed, but with certain reservations.

The law is thus stated by Parsons:—"If both are substantially in fault the loss also rests where it falls by the rules of the Common Law. . . . In Admiralty the rule was once said to be, in the case where both are in fault, that the loss should be apportioned between the parties, meaning according to the degree or measure of the fault of each if either decidedly preponderates; but if they are equal, or nearly so, the whole damage is divided between both, without reference to their respective values. But it seems now to be determined by adjudication, that the loss shall be divided equally. Still the equity power of the Court of Admiralty might qualify this rule when the fault was vastly greater on the one side than the other (see *Ralston v. State Rights*, Crabbe 22). This rule has been held not to apply when both parties are wilfully in fault," (Parsons on Shipping

Vol i., p. 528), and is criticised by Conkling in his "Admiralty Practice" as follows:—"The justice of this rule of *equal* apportionment between two culpable vessels, has been severely questioned; and considering the great disparity in the degree of culpability which may appear to be, and often is attributable to the respective parties, the rule must be conceded to be extremely defective as a means for the attainment of particular justice" (Conkling U.S. Adm. Pr., p. 301).

Before leaving the subject altogether it may be of interest to observe, that prior to the passing of the Judicature Acts, neither the Admiralty rule, nor that of our Courts of Common Law, was universally in use in our own Colonies. It will be seen (Appendix A., § 13) that the Code of Laws in force in Lower Canada on the subject, was similar to the French Code of Commerce; whereas in Upper Canada (originally a British Colony) the English Common Law was in force, whilst in both the laws administered by the Vice-Admiralty Courts was that of the Admiralty of England. (The *Sarah Anne*, Stewart, Lower Canada, Adm. Rep. 294. The *Germany*, Stewart, Quebec, Adm. Rep. 158.) Now, however, by the Statute of the Dominion (Appendix A., § 13), the Admiralty Rule prevails in all Courts as at home. In the Ionian Islands up to the period of their rendition to Greece, the Code was identical with that of France, and at the present time, so far as I have been able to ascertain, the Code of Commerce which was enacted in the Mauritius when still in possession of the French in 1809, remains unrepealed (Laws of Mauritius, Vol. ii., p. 570), though there also the Vice-Admiralty Court would administer the law of the English Admiralty.

(III.) *As to the claim of the Admiralty rule to Equity.*

If the damage done to each vessel is equal where both are to blame for the collision then it is immaterial whether each pays half the whole damage as in Admiralty or each pays its own as at Common Law.

If the damage done to one is greater than to the other, then if the vessel sustaining the greater damage is also the most to blame, the Common Law rule is more equitable than that of the Admiralty and may be absolutely accurate. If, on the other hand, the vessel sustaining the less damage is the most to blame the Admiralty rule more nearly approximates to absolute justice, but cannot ever actually reach it.

That is, that out of the three classes of cases which can arise, one both laws are alike, in another the Common Law is always nearer to exact justice and may actually achieve it, and in the third though the Admiralty rule is more near to absolute justice can never attain it. I think too that, as a matter of practice, will be found that far more cases fall into the second than into the third class; When vessels are under way the vessel most damaged is usually the one which is attempting to cross the bows of the other, and in that case there is, I think, a presumption that she is most to blame. When one vessel is at anchor she can but seldom be to blame (except under the statutory provision as to lights), and therefore the rules of "both to blame" do not apply.

(IV.) *As to the claim of the Admiralty rule to promote Security*

It is difficult to understand why the knowledge that the small error in obeying or neglect to obey the regulations in force under the ordinary law of the Sea, will disentitle the person in default to recover any part of the damage he may receive, should operate to bring about collisions which would not otherwise happen, whilst a knowledge that default on his part, however great, provided the other vessel is also in default, will not preclude him from recovering a half of that damage, should have the contrary effect. The result of the Common Law rule may probably would be to induce both vessels more strictly to observe the law and to avoid the collision altogether. If, however, as has been suggested, the effect of the Common Law rule would be that each to avoid damage to himself would endeavour to present his least vulnerable point, his stem, to the other vessel, premising that they would only do so when each vessel was already in some way to blame, and therefore already disentitled to recover damages, what would be the result? Surely that the vessels would be more likely to meet on parallel courses, end on to each other. It requires no great mathematical calculation to see that the *a priori* chance of two vessels actually striking each other at all is greatly lessened when the part of each opposed to the other represents the breadth instead of the length of the ship, assuming the ratio of breadth to length to be as 1 : 8, the chance of collisions happening

at all would be diminished in number, up to that ratio, in exactly the proportion that vessels succeed in directing their stems instead of their broadsides to one another. But that is not all, as the greater speed of a vessel does not diminish the damage she receives, each vessel would, as now, endeavour, by stopping and reversing, to reduce the damage she herself would sustain as far as possible, and then even supposing them to succeed in actually coming into contact, stem to stem, the blow being struck fair and in the strongest part of each, the damage sustained by either or indeed both together would not be nearly equal to that now sustained by one when her side is torn out in crossing the other's bows, or by the other whose stem is probably wrenched over. But the chance of the two vessels coming exactly stem to stem is extremely remote, the more probable event being that the two vessels will come bow to bow and so the surfaces in contact meeting at the finest angle, instead of a disastrous collision, a mere sliding blow is given and graze sustained by each.

I do not, however, dwell at greater length on these the 3rd and 4th objections to the Common Law Rule as they are neither of them matters of law but rather questions of opinion and maritime skill, on which sailors and scientists, rather than lawyers, should be judges.

Still it appears an infringement of the maxim, *Fiat Justitia Ruat Cælum*, to bribe a wrongdoer not to increase his misdeeds by offering him half his claim and a somewhat peculiar rendering of *Communis error facit Jus*.

If, in the present unfortunate dispute as to the law of Real Property in Ireland, in a case where an extortionate demand for rent was met by an exorbitant one for compensation for improvements, and both parties were preparing to enforce their claims, the landlord by eviction of the tenant and the tenant by murder of the landlord, the law were to enact that if the landlord would not evict, nor the tenant shoot, the former should recover half his rent and the latter obtain half his claim for improvements, little could be said for the justice of the arrangement, and yet the case is not altogether dissimilar from the one under consideration.

Enough has however been said to show that the claim of the

Admiralty rule to have Antiquity, to do Equity, and to give Security is no case proved and that its main claim, that to Ubiquity, is wholly unfounded; Whereas there can be no doubt of the Antiquity of that which is both the Civil Law of Rome and the Common Law of England, and though that law does not claim Ubiquity it has the practice of half Europe in its favour, and has at least as good a claim to do Equity and give Security as the Admiralty rule.

Having drawn attention to the differences existing in the laws of the various Maritime States as to the liability for damages in collision cases where both are to blame, it may before leaving the subject be well to consider some other differences which exist in those laws.

(I.) *As to the limit of liability.*

It appears that the Codes of Maritime law of the middle ages mitigating the severity of the Civil Law, by an extended application of the principle of the Noxal action (Dig. 4, 9, 7), limited the liability of a shipowner for the acts of his servant to the value of the ship and freight, and this must at all times practically be the limit in a suit brought in a country in which the owner of the ship has no property other than the ship. In most of the Maritime States at the present day, this principle of limitation is still in force, that is, that the liability of the owner or part owner ceases on a surrender by him of the ship or the share of which he is owner, and of the freight. (See App. A. Fr. Art 216, Hol. Art 321, Port. No. 1389. Germ. Art 451, 452, Nor., Art 65, Swed., Sec. 49.)

This regulation obviously acts excessively harshly where a vessel of comparatively small value has in a collision occasioned by her default done much damage, possibly to the extent of sinking and utterly destroying a vessel much more valuable than herself, the hardship being still further increased when the vessel causing the injury is herself much injured or wholly lost, in which latter alternative the injured party is wholly without any remedy for the loss inflicted on him, except an action against the master which would probably, if successful, be illusory. This latter hardship is obviated by the English Law, which puts an arbitrary limit to the liability of a shipowner irrespective of the value or the existence

of his ship, subject, however, to the qualification that if the owners of a ship, instead of each possessing their respective shares in the ship, constitute themselves a Company with limited liability and no property other than the ship, the liability of the Company is of necessity limited to the value of the ship herself.

The law itself was no doubt, as already pointed out, founded on the Noxal action in Roman Law (Inst. I., iv. 8 & 9), by which where there was no actual fault or privity of the owner of a slave or domestic animal by which damage was done to another, the owner could divest himself of liability for the injury by giving up that which had actually caused it. It may be noted in passing that there is another analogy between the Noxal action and the Maritime suit *in rem*, as in the former the damage inflicted attached to the slave or animal actually inflicting it and passed into the hands of a new owner, in a precisely similar way to that in which a Maritime lien attaches to a ship for damage done by her, notwithstanding a change of ownership posterior to the date of the damage.

I do not propose, however, to go more fully into the subject of the Limitation of Liability of owners seeing it has been so fully dealt with by writers on Maritime Law both here (Abbott on Shipping, Chap. v., Maude and Pollock, Tit. "Owner," MacLachlan Mer. Shipping 2nd Ed., pp. 109—116; Foard on Merchant Shipping, Ch. iv.) and in the United States. (Parsons on Shipping, Boston, 1869, Vol. ii., Bk. i., Ch. xvii.), except to observe that in this matter also the law of England is not identical with that of all her own Colonies (see App. A., 14).

But having considered the past and present laws of various countries as to the liability for collisions where both ships are to blame and the limits of that liability it may be well to consider what results follow in some other cases, according to the law by which the liability is decided.

(To be continued.)

WEATHER CHARTS AND STORM ATLAS OF THE INDIAN OCEAN.

ANY, if not most, of our readers must be fully aware of the assiduity with which the science of meteorology has through long years been pursued in the small island of Mauritius; indeed we may say that the Meteorological Society of the island has attained a world-wide fame for the valuable papers it has issued, from time to time, not alone on the hurricanes of the Southern Indian Ocean, but on the general meteorology of that ocean. Nor can we forget that much of this fame is due to the enterprise and zeal of Mr. Charles Meldrum, the secretary of the Society, and now head of the Royal Alfred Observatory in Mauritius. All shipmasters who have visited the island will remember his persistency in obtaining abstracts of their log-books, and his courtesy in communicating information on any desired subject connected with the navigation of the Indian Ocean at any particular season of the year. There are those also who may remember "A Meteorological Journal of the Indian Ocean, for March, 1853, with a summary of the results of the observations," by Charles Meldrum, secretary of the Mauritius Meteorological Society; originally published in the colony, and afterwards reprinted by the Board of Trade. This was an elaborate work on the various systems of wind that usually prevail throughout that month, and much new information was given on the connection of the N.W. with the N.E. monsoon, and on the S.W. monsoon with the S.E. trade; and also on the formation of hurricanes in the belt between the N.W. monsoon and S.E. trade. Since that date, however, observations have fast accumulated, and the study of more abundant facts has thrown new light on subjects that were at that time but dimly perceived. It is well, then, that the mass of material stored up in Mauritius should be available for general information, and Mr. Meldrum has issued a prospectus of the views he entertains on the subject and the method he purposes pursuing in the publication.

The prospectus itself will barely admit of condensation; and most probably our readers will wish to know all about the work now projected:—

During the last thirty years, the Meteorological Society of Mauritius has been tabulating the observations recorded in the log-books of vessels arriving at Port Louis, and a large body of information has thus been amassed, relating to the direction and force of the wind, the pressure and temperature of the air, the currents and state of the sea, &c., in all kinds of weather, over the navigated parts of the Indian Ocean, from lat. 20° N. to lat. 46° S., and from the meridian of Greenwich to long. 120° E.

There are two classes of *registers*. In one of these, called *journals*, are tabulated, for the same day, and for each hour at which observations were made, from midnight to midnight, the positions of the vessels, the direction and force of the wind, the readings of the barometer and thermometer, the character of the clouds and weather, and the set and rates of the currents, with remarks on the veerings and shifts of the wind, the state of the sea, &c. In the other class of *registers*, called *Storm-Books*, is given detailed information, often comprising hourly or half-hourly observations, regarding *gales* and *hurricanes*.

The observations are considerably more numerous in some years than in others. In 1861, for example, which was a year remarkable for hurricanes, 24,998 observations were tabulated, giving an average of 68 observations of 24 hours each for every day.

It has been resolved to endeavour to utilise these observations, by preparing and publishing:—

(a) Daily *synoptic weather charts* of the Indian Ocean for a whole year, showing, as far as possible, the direction and force of the wind, the temperature and pressure of the air, and the state of the weather and sea, at a certain moment of absolute time, on each day:—

(b) Charts showing the normal wind and weather, the mean temperature and pressure of the air, and the average limits of the trade-winds, monsoons, and variables in the months of January, April, July and October:—

(c) A *Storm Atlas*, showing, in a series of charts, the principal

results obtained respecting the more remarkable atmospheric disturbances of the Indian Ocean since 1847, such as the *tracks, courses, and extent of tropical hurricanes*, north and south of the equator, and of the extra-tropical *gales* between the parallels of 30° S. and 46° S., for each year; the directions and force of the wind, the state of the weather and sea, the isotherms, and isobars, in a few tropical *cyclones*, at a certain hour of each day, throughout their duration; and the connections of such cyclones with the prevailing winds.

With regard to the utility of *daily synoptic weather charts*, it is generally admitted that simultaneous observations over wide areas are the best means for obtaining an insight into the laws of weather-changes. Some persons, whose opinions in such matters are entitled to great weight, consider that all that is required for ordinary seamen is a simple *resumé* of results; and that may be very true. But, to many others, no statement of results can be so satisfactory as daily or hourly details presented in a graphic form. The mere enunciation of results, for the benefit of practical men, is not much calculated to advance meteorology as a science. If the details are accessible to only a few, investigation is crippled and progress retarded. The highest authorities, therefore, have recommended the synchronous method. In a letter dated February 16th, 1876, addressed to the late Sir William Sterling Maxwell, as Chairman of a Treasury Committee on the Meteorological Office, London, the President and Council of the Royal Society stated that the preparation and publication of *weather charts* were "eminently worthy of the support of the Government," and distinguished meteorologists of different countries have expressed similar views. The Government of the United States of America, in particular, has expended large sums on synoptic work.*

A large mass of materials being available, it is considered that the charts of averages should be for periods not exceeding one month. This, it is believed, would be an improvement upon most

* For examples of the usefulness of synchronous observations, see "Weather Charts and Storm Warnings," by Robert H. Scott, M.A., F.R.S. (Henry King & Co., London).

the similar charts now extant, which, however valuable and interesting, give averages for only each quarter. January, April, and October, are selected as a commencement, because in these months the effects of seasons are strongly marked.

The Atlas, giving in a series of charts, accompanied with letters, the results of numerous observations relating to storms and canes in the Indian Ocean during more than thirty years, could it is thought, fail to be of practical utility to seamen, and interesting to others, showing, as it would, among other things, the tracks, extent, duration, &c., of upwards of 200 tropical *cyclones* in the space between the Equator and 30° S. alone, the circumstances under which they existed and ended, and the meteorological conditions which then existed at Mauritius.

The following portions of the work have been completed, viz. :
 1. Synoptic weather charts for January, February, and March, 1861;
 2. The Tracks of Cyclones, south of the Equator, from 1855 to 1860. Some of the remaining portions are well advanced.

We have before us the "Synoptic Weather Charts of the Indian Ocean for the month of February, 1861," forwarded as a specimen of the synoptic part of the work.

These charts, which were lithographed by Messrs. W. and A. Johnston, Edinburgh, are based upon observations made on nearly 200 vessels, and they show us, in a graphic form, the state of the winds, weather, &c., at noon on each day, the meridian of 60° E. being adopted as the *first* meridian. Most of the observations were collected at Mauritius, and nearly all the others were obtained from the Meteorological Office, London. The directions of the wind have been corrected for magnetic variation.

In the observations of the barometer and thermometer register, observations evidently erroneous rejected; and every possible care taken to insure accuracy, without regard to the hypotheses—the sole object being to give a faithful representation of facts. Isothermal and isobaric lines, which have been freely drawn all over the ocean, have only been made when observations justified their delineation. The temperature of the air are, however, given only of each day.

t of monthly averages, three shillings, and that of a copy of Storm Atlas, forty shillings.

the total number of copies of the whole work, or of any portion, that may be subscribed for, exceed four hundred, the prices be proportionally reduced.

inally, any funds that may be left over, after paying all expenses, will be used in preparing and publishing synoptic charts of some other year, as 1867, or 1878, which were remarkable for a comparative absence of hurricanes in the Indian Ocean.

f the synoptic charts for February, 1861, about 250 copies remain.

We cannot do less than recommend every shipmaster who can afford it to purchase a copy of the whole work; of its substantial value there is no question. Probably the Meteorological Office could furnish information as to where copies may be obtained, failing that, a direct communication with Mr. Meldrum, at Mauritius, might have a satisfactory result.

NEW STEAMER FOR GUION LINE.—The launch of the new steamer *Alaska*, for the Guion Line, took place on the 15th inst., at the yard of Messrs. Jno. Elder and Co., of Govan, Glasgow. Her dimensions are as follows:—Length, over 500 feet; beam, 50 feet; depth, 38 feet; horse-power, 10,000. Tonnage, not yet ascertained, but she will be considerably larger than the s.s. *Arizona*, whose measures are as follows:—Length, 465 feet; beam, 46 feet; depth, 37½ feet; horse-power, 6,000; tonnage, 5,146. She is expected to attain a much greater speed than the *Arizona*, which is now known as the *fastest Atlantic steamer afloat*, having made the quickest passages on record. The *Alaska* will have accommodation for over 300 first class, and a large number of second class steerage passengers.

*PORTS AND HARBOURS ICEBOUND IN 1880-1881.

A RETURN of the time during which the Ports and Harbours given herewith were closed by ice.—Winter, 1880-1881.

WHITE SEA AND NORWAY.

Remarks as to Closing.	Last shipping movements reported in S. & M. G.	Closed		Open	First shipping movements reported in S. & M. G.	Remarks as to Opening
	Oct. 13	—	Archangel	May 18	June 1 *	*Reported White almost free.
Fairway blocked at intervals from Jan. 21 to Mar. 14	—	Dec. 23	Vefsen		—	
		—	Christiansand		—	
		Feb. 25	Lyngoer	Mar. 17	—	
For sailers*	—	Mar. 5 *	Porsgrund	Feb. 1	—	
		—	Tonsberg	—	Apr. 1	Navigation started by ice
Fjord still closed Apr. 27	—	Jan. 19	Laeso	Mar. 20	—	
	—	Dec. 1	Dram Fjord ..	—	—	First vessel at April 20.
Port of Christiania not closed at all for steamers	—	Mar. 3	Christiania Fjord	Apr. 17	—	
			Moss Sound ..	May 10	—	Navigation going on April 20.
	Dec. 23	—	Frederikstadt	—	Mar. 1	
	Nov. 9	—	Frederikshald	Apr. 21	—	

SWEDEN.

		Jan. 19	Göteborg ..	Apr. 19	—	Channel open different ports steamers in February 2.
		Jan. 14	Uddevalla	Apr. 25	—	
		—	Lysekil	Mar. 31	—	
		—	Marstrand	Mar. 30	—	
		Oct. 30	Carlstad	May 25	—	
		Jan. 19	Wargo	—	—	
		Jan. 25	Warberg	Apr. 1	—	
		—	Falkenberg ..	Apr. 6	—	
Bay reported become free Feb. 14	—	—	Halmstad	Apr. 5	Apr. 5	
Was then closed*	Jan. 8	—	Helsingborg ..	Mar. 30	—	
	Jan. 5	Jan. 23 *	Landscrona ..	—	Mar. 23	
	Jan. 17	—	Malmö	—	Mar. 28	
Still open Feb. 8	—	—	Trelleborg	Mar. 23	—	
Still open to sailers Jan. 25	Jan. 23	—	Ystad	Mar. 22	Mar. 24	Barrier of ice formed off hour, April
	Dec. 14	—	Carlskrona ...	Apr. 2	Apr. 22	
	—	—	Cimbrishamn ...	Mar. 29	—	
	Dec. 6	—	Carlskrona ...	Apr. 18	Apr. 30	
Steam communication with Öland ceased*	Jan. 1	Jan. 13 *	Calmar	—	Apr. 30	
			Gotland Island	May 7 *	—	*All harbours
Was then closed*	—	Mar. 1 *	Visby	May 1	—	
	Nov. 17	—	Oskarshamn ..	May 7	—	

* We republish this useful table from the columns of the *Shipping and Mercantile Gazette*.

SWEDEN—continued.

as to Closing.	Last shipping movements reported in S. & M. G.	Closed.		Open.	First shipping movements reported in S. & M. G.	Remarks as to Opening.
	Nov. 12	—	Westerwik	Apr. 23	May 29	
	Nov. 20	Dec. 18	Norrköping ..	May 12	May 12	
			Nyköping	May 8	—	
	Dec. 7	Jan. 15	Stockholm	May 7*	May 7	A vessel sailed Apr. 6. *Open for steamers: first sailer arr. May 10 Harbour still blocked June 16.
			Oregrund	—	—	
			Westeras	May 15	—	
			Landsort and Harhamra anchorage	April 24	Apr. 24	
	Jan. 8	—	Sandhamn	Apr. 28	Apr. 28	
	Nov. 25	Dec. 9	Gefle	May 27	May 26	Still much ice in Gulf June 11. Again open June 14. Harbour still closed June 15.
			Skutskar	—	—	
ed*	Nov. 11	—	Söderhamn ..	May 30*	*June 5	*Was then open.
	—	Nov. 17*	Indikswall ..	May 26	—	
			Husom	May 25	—	
	Dec. 7	Dec. 7	Sundswall	May 25	—	
and covered Oct. 20	Oct. 22	—	Hernösand	May 27	—	
			Nordmaling ..	May 30	—	
ov. 4	—	—	Umeå	May 27	May 30	
ov. 4	—	—	Skellefteå	June 8	—	
ov. 4	—	—	Piteå	June 8*	—	*Then open—harbour still encumbered by drift ice.
		Nov. 4	Luleå	May 29	May 29	
		Oct. 26	Kalix	—	—	
		Nov. 4	Haparanda	June 18	June 18	

RUSSIA.

			Torneå	June 18	—	
			Uleåborg	Jne. 15*	—	*Was then open.
			Ny Carleby	Jne. 11*	—	*Was then open.
	Oct. 13	—	Björneborg ..	May 30*	—	*Was then open.
			Raumo	May 30*	—	*Was then open.
			Nystad	May 30*	May 25	*Was then open.
	Dec. 1	—	Abo	May 21	May 21	
			Hango	—	—	Steamer trying to work out May 11.
			Ecknæs	May 30*	—	*Was then open.
			Lovisa	May 30*	May 25	*Was then open.
	Dec. 1	Dec. 15	Helsingfors ..	—	May 24	
	Oct. 5	—	Wyborg	May 30*	May 24	*Was then open.
	Nov. 29	—	Kotka	May 30*	May 23	*Was then open.
			Fredrickshamn	May 22	—	
	Nov. 12	Nov. 15	Cronstadt	May 20	May 21	
	Oct. 28	Nov. 10	Narva	May 18	May 20	
	Jan. 18	Jan. 10	Reval	May 12*	May 13	*Previous to.
	Jan. 8	Jan. 18	Baltiport	May 8	May 10	
	Dec. 15	Dec. 14	Pernau	May 18	May 18	
	Jan. 11	—	Riga	May 8	May 8	Domesnes quite clear May 14.
ed*	Nov. 26	Jan. 25*	Windau	—	May 1	
occasionally ed from end	—	—	Libau	Apr. 9*	—	*Harbour and sea free of ice.

GERMANY.

Remarks as to Closing.	Last shipping movements reported in S. & M. G.	Closed.		Open.	First shipping movements reported in S. & M. G.	Remarks as to Opening.
	Dec. 23	—	Memel	—	Apr. 4	Ice in Half adrift 11.
First closed Dec. 6. . . .	Jan. 18	—	Pillau	—	Mar. 21	Half free Apr. 1
Dantzic Bay covered with firm ice Jan. 19	Dec. 15	—	Königsberg	Apr. 13	—	Bay finally free
	Jan. 23	—	Dantzic	Mar. 30	May 21	
	Sept. 29	—	Stolpemuende ..	—	—	
	Jan. 25	—	Rügenwalde ..	Mar. 27	—	
	Dec. 25	—	Colberg	—	Apr. 24	
Swinemuende harbour frozen over Jan. 18	Jan. 9	Jan. 8	Stettin	Apr. 12	Mar. 23	First arrival 8 muende Mar. 2
	Jan. 6	Jan. 11	Wolgast	Mar. 21	Apr. 4	
	Jan. 2	Jan. 10	Stralsund	Apr. 2	Apr. 2	
			Arcona	Apr. 5	—	
A str. assisted in Jan. 23	Jan. 6	Jan. 18	Rostock	Mar. 19	Mar. 23	
	Dec. 24	—	Wismar	Mar. 4	Mar. 27	
	Jan. 8	Jan. 25	Lubeck	Mar. 24	Mar. 23	
Lighthouse extinguished Jan. 25	—	Jan. 25	Travemuende ..	Mar. 24	Mar. 16	Channel for ste cut Mar. 16.
Do. re-lighted Mar. 9						*Bay quite free.

DENMARK.

Previous to*	Jan. 12*	—	Ronne (Bornholm)	—	Apr. 3	Ice still fast M
Firm ice outside Feb. 14	Nov. 9	—	Neustadt	Mar. 18	Apr. 1	
			Burg-en-Fehmern	Mar. 19	—	
	Jan. 8	Jan. 20	Helligenhafen	Mar. 24	—	
All Danish lightships to be withdrawn Jan. 17*	Jan. 16	Jan. 19	Kiel	Mar. 31	Mar. 26	
First account of ice Jan. 11	Jan. 21	Jan. 21	Flensburg	Mar. 25	Mar. 28	
First account of ice Jan. 17; frozen over*	—	—	*Copenhagen ..	Mar. 19	Mar. 20	
	—	—	Dragor	Mar. 19	—	
	—	Jan. 19*	The Sound	Apr. 4*	—	*Free of ice.
	Jan. 15	—	Korsøer	Mar. 31	Apr. 2	
	Jan. 2	—	Svendborg	Apr. 4	Mar. 30	Ice blockade 76 days.
	—	—	Nakskov	Mar. 24	—	
Previous to*	*Jan. 12	—	Horsens	Apr. 6	Apr. 21*	*Previous to. Finally free Mar. 13.
Full of ice Jan. 18	—	—	Great Belt	—	—	
	—	—	Nordby	Mar. 19	—	
	Dec. 30	Jan. 13	Odense Fjord ..	—	Mar. 30	
	Jan. 17	Jan. 20	Aarhuus	Mar. 19	Mar. 20	
Previous to*	—	*Jan. 22	Grenaa	Feb. 2*	—	*Quite open.
First closed*	—	*Dec. 31	Randers	Mar. 19	—	
	Jan. 8	Jan. 11	Aalborg	Apr. 17	Apr. 16	
	—	—	Thisted	—	Apr. 22	
Never quite closed to steamers, and only at intervals to sailers	—	—	Fredrikshavn ..	—	—	Finally free Ma
First account of ice Feb. 2	—	—	The Seaw	—	—	Last account Feb. 26.
Full of ice Jan. 19	—	—	The Cattagat. .	—	—	

NORTH SEA.

Closing.	Last shipping movements reported in S. & M. G.	Closed.		Open.	First shipping movements reported in S. & M. G.	Remarks as to Opening.
ed Dec. 5	—	—	Tonning	Mar. 31*	—	*Eider lightships replaced.
ice Jan. 5	—	—	The Elbe (Hamburg)	—	—	Ice adrift Jan. 29; last account ice Mar. 16.
sailers Jan. 10	—	—	The Weser (Bremen)	—	—	Only a little drift ice remaining Jan. 23.
en Jan. 17	—	Jan. 14	Ostmahorn	—	—	Preparations to cut ice in N.S. Canal Jan. 22.
S. Canal	—	—	Amsterdam ..	—	—	
an. 18 ..	—	—	Nieuwe Diep ..	—	—	Free Jan. 28.
drift ice	—	—	Rotterdam	—	—	
ice Jan. 13	—	Jan. 24	The Schelde (Antwerp)	Feb. 3	—	Open to steamers drawing not more than 16 ft. Jan. 23.
	—	Jan. 11	Emden	—	Feb. 12	
	—	Jan. 14	Leer	—	Mar. 9	

NORTH AMERICA.

Dec. 30	—	—	Baltimore, U.S.	—	—	Free of ice Feb. 14.
an. 11	—	—	Philadelphia, U.S.	—	—	Breaking up Feb. 10.
	Nov. 10	—	Arichat, C.B. ...	—	May 5	
	Dec. 22	—	Sydney, C.B. ...	—	Apr. 23	
	—	—	Pt. Mulgrave, C.B.	—	May 2	
	Nov. 30	—	Pictou, N.S. ...	—	May 20	
	Dec. 9	—	Charlottetown, P.E.I.	—	Apr. 30	
	Dec. 3	—	Shediac, N.B.	—	May 1	
	Nov. 25	—	Richibucto	—	May 11	
	Nov. 25	—	Miramichi riv.	—	May 11	
	Nov. 15	—	Caraguet, N.B.	May*	—	*Early in.
	Nov. 17	—	Bathurst, N.B.	—	May 11	
	—	—	Magdalen Ids.	—	—	
	Nov. 25	—	Paspebiac, N.C.	—	May 17	
	Dec. 2	—	Perce, N.C.	—	—	
	Dec. 2	—	Gaspé	—	May 10	
full of	Nov. 19	—	Quebec	Apr. 14	Apr. 30	
7, 23	Nov. 19	—	Montreal	Apr. 19	May 2	

SUNDRY PLACES.

	—	Jan. 17	Caledonian Cnl.	Feb. 3	—	
rs*	—	*Jan. 15	Stockton	Jan. 29	—	
	—	Jan. 17	Goole	—	—	Humber clear Jan. 23.
	—	Jan. 17	Boston (Witn.)	Jan. 31	—	
Jan. 24	—	Jan. 26	Seine	Jan. 29	—	
Jan. 20-21	—	—	Loire	—	—	
	—	Jan. 29	Sulina, Danube	Mar. 19*	—	*Navigation finally reopened.
	—	Jan. 19	Nicolaieff	—	May 4	
	Dec. 12	—	Kertch	—	May 16	
	Nov. 10	—	Taganrog	Mar. 17	Apr. 30	
	Nov. 25	Nov. 17	Newchwang ..	Mar. 23	Mar. 23	
ed*	—	Dec. 23*	Tientsin, Peiho	Mar. 10	Mar. 13	
	Nov. 22	—	Vladivostok (Amoor river)	—	—	

THE MARKING OF THE THAMES ENTRANCE.

THE Abstract of Sea Casualties on and near the coasts of the United Kingdom, long familiarly known as the "Wreck Register," gives a list of 519 outlying sands and rocks on the coasts of the United Kingdom upon which vessels are liable to be stranded. On one or other of these numerous dangers it appears that, taking the average of ten years, no less than 274 vessels are annually stranded. On some, however, of these spots the casualties do not exceed from one to two in ten years; while, on the other hand, where they lie in the highway of the traffic, wrecks occur at the rate of five to seventeen in the year. It has long been notorious that the East Coast, between Duncansby Head and Dungeness, holds the unenviable distinction of claiming fully one-half of all the wrecks, casualties, and collisions that take place on the coast of Great Britain and Ireland; and that there are certain parts of even this coast which are more pre-eminently fatal than the rest—such, for example, as the sands fronting Norfolk, and those in the approaches to the entrance of the Thames.

That part of the Thames entrance which lies opposite to Orfordness, spreading across to the Downs, is very generally known to seamen as "Over the Kent," and through this district lies the track of vessels bound from our northern ports to the English Channel, and equally from the channel to the north, as well as of vessels bound to London. Our purpose is to draw special attention to so much of this space as is included between the Shipwash, the Long Sand, and Kentish Knock to the westward,—and the Inner Gabbard, Outer Gabbard, and Galloper to the eastward,—or rather to an area of about 300 square miles (geographical), bounded by those sands, and extending from the parallel of the Shipwash light-vessel on the north to the Kentish Knock light-vessel on the south. The whole of these shoals may be said to be steep-to, but, at low water, the Long Sand and Kentish Knock dry in patches, while the Shipwash

as not more than a foot of water on it near the centre. As a rule the depths are greater in the vicinity of the two Gabbards and the Galloper than they are towards the Shipwash, Long Sand, and Kentish Knock, but not markedly so, and soundings over the whole area have a general uniformity, except in the immediate neighbourhood of the sands, where, in working, it is dangerous to stand towards the Shipwash into less than 12 fathoms, or towards the Long Sand into less than 10 fathoms. The only exception to this general uniformity of depth distributed over the area between the shoals, is a gully, nearly two miles wide towards its northern and broadest part, trending in a S.S.W. direction for $2\frac{1}{2}$ miles, but which towards its southern extremity terminates in a lengthened fork, nowhere exceeding a mile in width. This gully has depths within it of 22 to 24 fathoms and more, but these depths at the forked end are separated by soundings of 12 fathoms, coinciding with similar depths and less amidst 13, 14, 15, and 16 fathoms in other portions of "Over the Kent." Nevertheless, the use of the lead over the gully is an excellent guide for avoiding the Inner Gabbard, from which it is two miles distant, and the Galloper, from which it is four miles distant. The track of steamers taking a departure from about two to three miles abreast of the Shipwash light-vessel towards the Kentish Knock light-vessel does not usually lie over the gully.

It is probable that many of the casualties happening in this vicinity, especially those of steamers, and the strandings that occur on the Long Sandhead and the Kentish Knock, arise from inability to take a good departure in hazy or foggy weather, and then not allowing for the set of the tide, although the instructions in the Admiralty Tide Tables are very full and specific on this head. Let us see. Abreast of Orfordness the flood stream sets W.S.W., and the ebb E.N.E.; both streams generally run fairly through the main channels, but across the shoals W.S.W., and E.N.E. At the Shipwash light-vessel the flood runs S.W. by W. and the ebb E.N.E. to N.E. There is, however, a rotatory movement of the streams within the area just described, which may be well understood by noting the changes

at the Galloper and Kentish Knock light-vessels. At low water by the ground the ebb stream becomes weak, and veering to E. by N., and east, soon ceases; the flood stream begins to run in a S.E. direction, veering then to southward and westward, when it sets about S.W., in which direction it continues until four hours after low water. During the next two hours it has veered to W.S.W., and subsequently to W. by S. and west, with slack water. The first of the ebb stream sets to N.W., veering round by north and east to N.E., and so continues for three hours: during the next two hours it changes to E.N.E., then to E by N., and finally to East. At the Kentish Knock the stream begins to run in a south-westerly direction just before low water, and so it continues, veering a little westwardly for $4\frac{1}{2}$ hours; it then runs W.S.W. W. by S. and west, when it ceases: the ebb stream begins at N.W., then gradually draws round to north and N.E. when the reserve of the flood takes place. It remains to notice that the direction of strong winds considerably affects both the times and the heights of high water. Winds from the N.N.W. to N.E. cause the tides to run much longer and stronger than winds from other directions, and it is mostly with an easterly wind that vessels get ashore, especially on the Long Sand and Kentish Knock. Navigators are too apt to forget that the slower the rate of the ship the greater must be the allowance for the force and direction of a current. For example, the course from a spot $3\frac{1}{2}$ miles abreast the Shipwash light to the Kentish Knock light is S.S.W. (correct magnetic); to make that good, with a steamer going 10 knots in a tidal current setting W.S.W. two knots, the compass course should be S. by W. $\frac{1}{4}$ W.; if, however, for foggy weather, the steamer's rate is slackened down to five knots, the compass course ought to be S. $\frac{1}{2}$ W., and this irrespective of any deviation of the compass.

We have already referred to the uncertainty of position from the depth, nor must it be forgotten that the nature of the bottom in the locality gives no indication of a vessel's whereabouts. To illustrate this more fully a vessel may be S.E. $\frac{3}{4}$ E. $2\frac{1}{2}$ miles from the south end of the Shipwash, and have exactly the same depth of water and the same character of bottom as midway between the south end of that shoal and south end of the Inner Gabbard. In

et, groups of similar soundings varying but two or three fathoms scattered over the whole area. A vessel may be getting considerably close to the sands when several successive casts of ten to twelve fathoms will be obtained; and yet she may have similar casts when in a perfectly safe position. There is no disputing the fact that there is such a sameness in the sounding, that it is generally allowed the lead gives but little indication of proximate danger.

Within or near to the area just described, there are, besides the warning buoys to the number of eight, the following light-vessels:—

The Shipwash, in nine fathoms, about a third of a mile northward of the Shipwash Sand, showing a *fixed white* light, with a powerful fog-horn:

The Sunk, in $9\frac{1}{2}$ fathoms, in the fairway of the East Swin, with *revolving* light showing *red* and *white* flashes alternately every forty-five seconds:

The Kentish Knock, in eleven fathoms, about two miles eastward of the Kentish Knock sand, showing a *white* light *revolving* every minute, with a powerful fog-horn:

The Galloper, in twenty fathoms, on the western side of the Galloper Shoal, and about $\frac{3}{4}$ of a mile N. by W. of its south-western extremity, showing two *fixed white* lights horizontally on separate masts.

The majority of the buoys are efficient in ordinarily fine weather, especially the S.W. Shipwash, the Long Sand head, the North Knock, and North Galloper, and there is no general complaint in respect of either lights or buoyage; nor is there any defect in either chart or sailing directions.

We are well aware that it is impossible wholly to extinguish the perils which beset ships and the life of sailors, nevertheless it appears to us that a very important improvement might be effected in the vicinity of the Long Sand and Kentish Knock, in which view we are borne out by the opinions of many practical master mariners. The Trinity House Corporation have recently introduced into their system a valuable character of light, and sound signal. We have reason to believe

that nothing would tend so much to facilitate navigation in this locality as the establishment of an additional light-vessel at about two miles E.S.E. of the Long Sand head buoy, the light to be of such distinctive character as the Trinity House might consider most suitable; and for thick and foggy weather it has been suggested whether the sound rocket which explodes at some considerable altitude in the air, might not be made available. One or other of these warnings would at once indicate to the mariner his position, and help him to clear the Long Sand and Kentish Knock when coming from northward and eastward; at the same time the removal of the Kentish Knock light-vessel to a position two miles S.S.W. of that in which it is at present moored, and hence about eight miles from the Long Sand head light-vessel would protect the body of the Knock. We are free to admit that these improvements are most especially required for thick weather—there is a sufficiency of guides for fine weather—but with a light-vessel as suggested in combination with a sound rocket for foggy weather, we fully believe that no more ships, except through the grossest negligence, would be stranded where not less than 16 now annually get ashore.

NEW DOCK AT LEITH.



THE following is an abridgement of a letter from a special correspondent of the *Times* :—

A new dock has been opened at Leith which is to be known as the Edinburgh Dock, in honour of the Royal Duke who performed the ceremony. Access to it is obtained through the Albert Dock, and the connecting passage is spanned by a massive swing bridge, which is adapted both for railway and for ordinary traffic. The site both of the Albert and of the Edinburgh Dock has been reclaimed from the sea, and is protected by a solid reclamation bank upwards of a mile in length. This embankment is in itself a stupendous piece of masonry. The wall is 80 ft. broad at the base and 10 ft. at the top, and in its construc-

On 100,000 tons of rubble and 8,000 cubic yards of ashlar and concrete were used. The breadth of ground reclaimed between the face of the embankment and the old foreshore varies from 250 ft. to 1,400 ft.—that is to say, it averages a quarter of a mile. The breadth of ground between the new dock and the sea is 225 ft., which affords ample space for sheds, lines of railway, and roadways.

The new dock is 1,500 ft. long and 650 ft. wide, but there projects into it from the middle of the eastern end a jetty 1000 ft. long and 250 ft. broad. At that end, therefore, the breadth of water on each side of the jetty is only 200 ft. But what is thus lost in water area is more than compensated for by the increased accommodation for berthing vessels and for wharfage and sheds. At the west end of the jetty there is a graving dock 300 ft. long. This is smaller than the Prince of Wales's Graving Dock in connexion with the Albert Dock, which is 470 ft. long; but it will be a valuable addition to the conveniences of the port. The superficial area of the new dock is $16\frac{2}{3}$ acres. The Albert Dock, which is the largest of the existing docks, extends only to $10\frac{1}{4}$ acres. The wharfage of the Edinburgh Dock is, in linear measurement, 4000 ft., or upwards of three-quarters of a mile. The masonry of the containing walls is of the most solid description, and is very handsome in appearance. The foundations rest on blue boulder clay—a formation eminently favourable in view of the requirements of the substantial superstructure. The northern side of the new dock will be appropriated to the coal traffic, which is expected to receive a new impetus from the convenience thus afforded to it. It is also intended to form special depôts around the dock for the importation of grain, timber, flax, and other leading imports—an arrangement from which the trade of Leith will doubtless derive benefit.

Including the Edinburgh Dock, there will now be five wet docks in connection with the port of Leith—three on the west side and two on the east of the inner harbour. All these docks have been constructed within the present century. What is familiarly known as the Old Dock was opened in 1806. The Queen's Dock, which is an extension of the Old Dock towards the west, was com-

pleted in 1817. After the adoption of free-trade policy, the commerce of the port increased rapidly, and the Victoria Dock, north of the Old Dock, was opened in 1852. During the next ten years the trade of Leith continued to grow 'by leaps and bounds,' and the Harbour Commissioners found it necessary to provide additional accommodation in docks and wharfage. They were forced, however, to encroach upon the sea, and the reclamation embankment now completed was begun, and the Albert Dock and the Prince of Wales's Graving Dock were completed in 1869. The additional accommodation thus provided was very soon found to be insufficient, and the great work inaugurated to-day was commenced in 1874. When this rapid progress is considered, it will be thought that the Commissioners have only shown ordinary prudence in providing for the extension of the docks at no distant period.

Some account of the progress of the trade and shipping of Leith during the last forty years will be of interest at this time, showing as it does very clearly the necessity there was for extended dock accommodation. The following table, compiled from the accounts of the Dock Commissioners, shows the receipts at intervals of ten years, exclusive of borrowed money:—

		Dues on Shipping.		Shore dues on Goods.		Total Receipts.
1840	...	£12,349	...	£8,828	...	£26,012
1850	...	10,366	...	13,084	...	27,717
1860	...	14,157	...	20,469	...	38,789
1870	...	20,423	...	30,303	...	56,626
1880	...	29,548	...	38,529	...	88,330

The following table shows the number and the tonnage of vessels entered at Leith at intervals between 1852 and 1880:—

		Inwards.			Outwards.	
	No.		Tonnage.	No.		Tonnage.
1852	...	4,682	...	350,286	...	—
1860	...	5,115	...	477,400	...	5,153
1870	...	4,929	...	713,364	...	4,910
1880	...	4,358	...	940,200	...	4,367

It will be noticed that while the number of vessels has decreased, their tonnage has increased nearly threefold in the case of vessels

ered inwards and nearly twofold in the case of vessels entered wards.

The chief imports at Leith are different kinds of grain, wheat being the first place and barley the second. The following table shows the quantities of grain of all kinds imported at intervals in 1874 :—

IMPORTS OF GRAIN.

1874-75	...	...	...	761,120	quarters.
1875-76	...	...	...	1,074,124	„
1878-79	...	...	...	939,033	„
1879-80	...	...	...	1,185,127	„

In 1875-76 most of the grain imported came from Russia (9,716 qrs.); Germany stood second (185,738 qrs.); and the United States third (130,264 qrs.) In 1879-80 most of the grain came from the United States (297,476 qrs.); Russia held the second place (267,969 qrs.); and Germany the third (252,160 qrs.) The chief exports from Leith are those of coal and iron. The following table shows the quantities exported during the last five years :—

	Coal.		Pig Iron.		Malleable Iron.	
	Tons.		Tons.		Tons.	
1874-75	...	296,193	...	147,329	...	1,563
1875-76	...	375,223	...	160,301	...	2,530
1878-79	...	165,009	...	140,168	...	1,132
1879-80	...	185,175	...	127,207	...	1,821

In 1875-76 most of the coal went to Germany (99,962 tons); Russia came next (88,220 tons); and France stood third (29,250 tons). Germany was also the best customer for pig-iron (86,615 tons); and the second best was Holland (39,248 tons). In 1879-80 most of the coal went to Russia (43,577 tons); Denmark (37,273 tons) stood second, and Germany (24,384 tons) held the third place. Most of the iron still went to Germany, though the amount was much smaller (43,803 tons); the United States stood second (23,022 tons); and Russia third (20,261 tons). In the latter year the export of coal to France fell to 9,409 tons, and that of pig-iron to Holland fell to 15,735 tons.

NOTES FROM CONSULAR REPORTS.

FRANCE.

Cherbourg.—The returns of the shipping trade for 1880, show a remarkable advancement in the commercial development of this port, and the Consul is of opinion that the facts prove the trade to be established on a sound basis, and that Cherbourg is destined in time to become an important commercial centre. A very noteworthy feature is that by far the largest portion of the foreign trade is carried on by British ships between Cherbourg and ports in the United Kingdom. Some increased activity has been shown as regards French shipping, but it does not approach the amount of trade carried on in British ships which continues to show an advance. The imports consist chiefly of coals, wood, wheat, fresh fish; the exports of butter, eggs, potatoes, barley, vegetables, wine, &c. The advance of the port is dependent to some extent on certain improvements being carried out, such as the extension of the existing piers and the construction of a new deep sea pier, the deepening of the entrance channel, the provision of additional dock and quay accommodation, &c., some of which works are now in hand.

Havre.—The Consul's report states that the commercial business of this port has, during the year 1880, been carried on as hitherto on a sound basis. Sundry important works are in progress with a view of increasing the accommodation and facilities for the shipping trade, notably the lighting of the entrance and the outer harbour by means of electricity and the construction of a new large basin and two careening docks.

The much vexed question of ship brokerage has at length entered into a more satisfactory condition, the shipbrokers of Havre having wisely resolved on making a considerable reduction in their tariff of charges. The imports of sugar and coffee have fallen off considerably in the past year, while wheat, wool, coals, dye woods, American provisions, cotton and petroleum all show a marked increase in the quantities landed. The Consul makes some very valuable observations on the subject of the protectionist policy now

rampant in France. The sub-districts of Caen, Honfleur, Rouen, Fecamp and Dieppe show a general increase in their shipping trade, by far the largest portion being carried on in British vessels.

Large quantities of coals, grain, and wood were shipped to these ports, mostly in British bottoms, but there is no record of any important cargoes being carried back, with the exception of eggs from the Honfleur district, and some agricultural produce.

St. Malo.—British trade with this port for the year 1880 shows an advance both as regards number of vessels visiting and the value of their cargoes. The imports were chiefly coals, wheat, oats, and pig iron, the only exports of importance being barley and potatoes.

The Consul reports the harvests of 1880 as having been generally good in quantity and quality. No returns are given of shipping of other nations trading with this port.

GERMANY.

Konigsberg.—Trade at this port in 1879 appears, by the Consul's report, to have been in a retrograde condition. Grain, petroleum, coals, wool, flour, and other articles of commerce, showed a marked fall as regards the quantities exported; some imports, such as colonial goods, bacon and lard, tea, showed satisfactory results, but other imports exhibited a decline. The value of the total exports by sea fell from 122,000,000 marks in 1878 to 96,000,000 marks in 1879, and the total value of imports from 251,000,000 marks in 1878 to 222,000,000 marks in 1879. The chief reason of this falling off appears to be the competition of the neighbouring Russian ports, to which goods are transported more cheaply and expeditiously. The entries and clearances of vessels were in 1878, 3,100 and 2,973, while in 1879 they were 2,147 and 2,034. The harbour works at Pillau are being carried out in a very extensive manner.

The Consul remarks that Konigsberg has now to contend with all sorts of difficulties, the hardest to bear being the return of the State to the Protection system of the Customs. Free trade is the breath of Konigsberg's commercial existence and Protection is certain downfall. The condition of the working classes must soon become deplorable, and although the merchants are still

existing on the gain of former years, the prospects are very distressing for all.

ITALY.

Venice.—The Consul, in this report, gives only the returns of British vessels entered at the port in the year 1880. From this it appears that there is an increase in tonnage, but a small decrease in the number of vessels. Details of the exports and imports are not given. A national line of steamers is about to be established to run between Venice and the ports of the opposite coast and of the Ionian and Grecian seas, which trade is now in the hands of the Austrian Lloyd's. It is said to be the intention of purchasing steamers in England, which might be a good opportunity for British shipbuilders. There seems to be but little energy for shipbuilding in Venice.

SWEDEN AND NORWAY.

Gothenberg.—The commerce of this district during the year 1880, has shown general progress, and special activity in some branches, though from unavoidable circumstances, the metal and wood trades have suffered. Grain, potatoes, cattle, hides, butter and cheese, iron and wood, are the chief commodities exported; the principal articles of import being cotton, spirits, salt herrings, bacon, coffee, rice, paper machinery, cutlery, salt, treacle, sugar, flour, coals, coke, pig iron, plates, rails, tobacco, wool and wine. On the whole, the commerce of the port for 1880 was satisfactory. Shipbuilding is almost at a stand still. The trade with Siberia has not yet developed, and in the opinion of the Consul is not likely to do so until further exploration has proved that access to that country is less hazardous than is at present believed: only steamships can be employed. There is generally a very brisk trade in wood before the Baltic ports open, and there is an increasing demand for the productions of the iron and steel works. The export of matches shows a steady increase, due it is said to the excellence of the article. A new herring fishery is being developed in the north-west, and has already proved very remunerative. The imports of coal for British ports have attained a high figure, but competition is very keen.

TRIPOLI.

Trade for 1880 is reported to have been dull. There was less activity and enterprise than in former years owing to a general feeling of uncertainty in commerce. Both imports and exports have decreased. In the former the decrease was caused chiefly by the demand in the local markets for wheat and barley having ceased, owing to the partial success of the corn crops of the country. There was also a falling off in British cloth manufactures, occasioned partly by a fall in the value of European manufactures, and partly by the insecurity of internal transport. Other imports such as colonial produce, oil, provisions, wines and spirits, &c., show no material alteration. In the exports, ostrich feathers have decreased greatly, other articles, esparto fibre, ivory, oxen, &c., showing little change. The trade with the interior has received a severe check by the pillage of a valuable caravan on its way to the port from the interior.

More vessels visited the port in 1880 than in 1879, but the aggregate tonnage was about the same, next to Ottoman vessels Italian ships were most numerous, then came British vessels. There is a smart competition between the steamers of the Compagnie General Transatlantique (French), and those of the Rubattino Company (Italian), running between Tripoli and Tunis.

TURKEY.

Thessaly.—The Consul says that want of money, insecurity from brigandage, and uncertainty as to political prospects, have operated as injuriously upon commerce as in the preceding year. It is however to be noted that British trade with the port of Volo shows a tendency to increase, and the Consul thinks it might be developed to a much greater extent. There appears to be a fair market for silk, cotton, woollen and linen goods, for earthen, china and glass wares, for rice, coal, iron, copper, brass, &c.; while the chief articles for export are, tobacco, cereals, olive oil, silk and cocoons, skins and wool. The number of British vessels entering and clearing from the port of Volo in 1880, is double what it was in 1879.

UNITED STATES.

Baltimore.—The Consul records a falling off in the total number of British vessels visiting this port in 1880, but this is compensated by the larger tonnage of those which actually entered and cleared. A very fine dry dock has been constructed offering great facilities for vessels requiring dock accommodation. From the Custom House returns it appears that the values of the imports and exports for 1880 were respectively \$18,643,253 and \$73,994,910. These returns indicate a very large amount of commerce. The chief imports are coffee from Rio, sugar and molasses, salt, wheat, and other kinds of grain. The sugar trade appears to have suffered from the combination of the refiners, by which competition has ceased. Importers have, therefore, transferred their operations to New York. The principal exports are cotton, tobacco, grain, petroleum, provisions and cattle;—10,771 head of cattle were exported from Baltimore to England in 1880. This is a business which is likely to increase very much, though it is a risky cargo for a vessel during the winter season. The cattle came mostly from the West and Virginia.

During the year trade became restricted for want of further elevator stowage room, and also on account of a scarcity of ocean tonnage. The former difficulty was remedied by obtaining outside stowage room, but the short supply of vessels continued until the close of the year. Additional elevator accommodation is being provided. The export of petroleum is shrinking, owing it is said, to the operations of the Standard Company which controls the trade of the country in this article. Exports of bacon, lard, and pork were carried on to a very large extent, larger indeed than ever before.

Baltimore is the great oyster mart of the United States. During the season from Sept 1879 to May 1880, 9,543 vessels bringing 7,252,972 bushels of oysters arrived at Baltimore.

Charleston.—During the year 1880, 461,574 bales of cotton were exported, chiefly to European ports. There were also considerable exports of lumber, rice and crude phosphate rock. For this latter article the Consul states that in the first year 76 British and many foreign vessels resorted to St. Helena Sound, one of the

is in communication with the port of Beaufort. There are a desire to extend the general trade of the vicinity. No are given of the imports, but it appears that the majority als enter the port in ballast.

eston.—The Consul reports a development of the resources port. Cotton, hides, wool, oil-cake, were exported. The lue of exports in 1880 reached £3,845,853, a considerable over preceding years. The imports are not as yet so e, but British vessels appear to have the lion's share of the g trade both in and out. Steel and iron rails were largely d from Great Britain ; also salt.

Orleans.—An increase both in number and tonnage of vessels entering and clearing is reported. The exports a large increase in grain, which, it is said, is likely to e, and a decrease in cotton. The Consul states, however, e commercial state of the city has not materially improved. healthiness of the locality, the influx of immigrants, who sick and destitute, the difficulty of obtaining useful rs, are among some of the causes of its decline. There is rn given of imports to New Orleans.

ONIAL CERTIFICATES.—We have been frequently asked for t of Colonial places where certificates of competency are l to masters and mates, and which are recognised by the Board of Trade. They are as follows :—Victoria (Australia) ; c ; New Zealand ; New South Wales (Australia) ; South lia ; Malta ; Tasmania ; Bengal (India) ; Queensland lia) ; Newfoundland ; and Bombay (India). A native of ited Kingdom must have been domiciled in the Colonies ee years before he can claim to hold a *valid* Colonial ate.

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

Applying the Tidal Constant of the place, according to its sign (+ add, - subtract), to the time of high water on the given day at the port of reference, you will obtain the time of high water at the place sought.

PLACE.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
	H. M.			H. M.	
Abbeville	-1 17	Leith	Jersey (St. Helier)	+2 38	Brest
Aberdeen	-3 52	Liverpool	Kinsale	-0 18	Queenstown
Aberystwyth	+2 59	Brest	Lerwick (Shetland)	-3 47	Leith
Aden	+5 13	Dover	Limerick	+1 15	Queenstown
Agincourt	-0 42	Leith	Lisbon bar	-1 17	Brest
Alger	+0 50	Brest	Littlehampton	+0 24	Dover
Alger	-2 25	Kingstown	Llanelli bar	-0 38	Weston-s.-Mare
Alger	-0 18	Greenock	Lowestoft	-4 1	London
Alger	-1 49	Leith	Lynn & Boston Deep	-0 29	Hull
Alger	-1 14	Queenstown	Margate	-2 18	London
Alger	-0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
Alger	-0 2	Brest	Milford Haven entr.	-0 58	Weston-s.-Mare
Alger	+0 8	Dover	Montrose	-0 52	Leith
Alger	-0 51	Liverpool	Morlaix	+1 6	Brest
Alger	+2 42	Londonderry	Needles point	-1 36	Dover
Alger	-1 5	N. Shields	Newcastle	+0 23	N. Shields
Alger	-0 8	N. Shields	Newhaven	+6 39	Dover
Alger	+3 3	Brest	Newport	+0 16	Weston-s.-Mare
Alger	+0 13	Dover	Nieuport	+1 6	Dover
Alger	+0 22	Devonport	Nore	-1 28	London
Alger	+0 19	Weston-s.-Mare	Orfordness	-2 43	London
Alger	-2 2	Brest	Oporto	-1 17	Brest
Alger	-1 56	Liverpool	Ostende	+1 13	Dover
Alger	+0 37	Dover	Padstow	-1 41	Weston-s.-Mare
Alger	-0 23	Greenock	Peel, Isle of Man	-0 15	Liverpool
Alger	+0 2	Weston-s.-Mare	Pembroke Dock	-0 42	Weston-s.-Mare
Alger	-4 23	Liverpool	Penzance	-1 13	Devonport
Alger	-0 10	Kingstown	Peterhead	-1 43	Leith
Alger	-0 47	London	Piel harbour, Barrow	-0 18	Liverpool
Alger	+4 2	Brest	Plymouth breakwater	-0 6	Devonport
Alger	-1 37	Londonderry	Poole	-2 2	Dover
Alger	-0 23	N. Shields	Port Carlisle	+0 47	Liverpool
Alger	-0 10	Brest	Portland breakwater	+1 18	Devonport
Alger	-0 27	Dover	Port Patrick	-0 58	Greenock
Alger	+4 41	Greenock	Portsmouth	+0 29	Dover
Alger	-2 21	Leith	Ramsgate	-2 19	London
Alger	+0 33	Devonport	Rotterdam	+4 33	Dover
Alger	+0 8	Dover	Santander	-0 17	Brest
Alger	+7 19	Brest	Scarborough	+0 48	N. Shields
Alger	+0 3	Kingstown	Selsea bill	+0 33	Dover
Alger	+0 17	Queenstown	Sheerness	-1 21	London
Alger	-0 11	Liverpool	Shoreham	+0 22	Dover
Alger	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
Alger	-0 16	Kingstown	Southampton	-0 42	Dover
Alger	-0 27	Dover	Spurn point	-1 3	Hull
Alger	+0 56	Dover	St. Ives	-2 10	Weston-s.-Mare
Alger	+0 38	Devonport	St. Malo	+2 18	Brest
Alger	-0 46	Devonport	St. Mary (Scilly)	-1 16	Devonport
Alger	+6 57	Brest	St. Nazaire	-0 7	Brest
Alger	-0 47	Brest	Stornoway	+6 38	Greenock
Alger	-1 59	Hull	Stromness (Orkneys)	-5 17	Leith
Alger	-0 12	Liverpool	Sunderland	-0 1	N. Shields
Alger	-0 5	Dover	Swansea bay	-0 53	Weston-s.-Mare
Alger	-0 29	Devonport	Tay bar	-0 11	Leith
Alger	+1 42	Dover	Tees bar	+0 23	N. Shields
Alger	-0 26	Queenstown	Tenby	-1 12	Weston-s.-Mare
Alger	-1 27	Brest	Thurso	-5 49	Leith
Alger	+0 10	Greenock	Torbay	+0 17	Devonport
Alger	+2 51	Weston-s.-Mare	Tralee bay	-0 58	Queenstown
Alger	+2 26	Brest	Ushant (Ouessant)	-0 15	Brest
Alger	-0 48	London	Valentia harbour	-1 19	Queenstown
Alger	-0 53	Hull	Waterford	+0 19	Queenstown
Alger	+2 50	Brest	Westport	-0 4	Queenstown
Alger	+0 5	N. Shields	Wexford	+2 20	Queenstown
Alger	-1 52	London	Whitby	+0 22	N. Shields
Alger	+6 4	Brest	Whitehaven	-0 9	Liverpool
Alger	+0 21	Dover	Wick	-2 55	Leith
Alger	-1 12	Liverpool	Wicklow	-0 41	Kingstown
Alger	-0 53	N. Shields	Workington	-0 19	Liverpool
Alger	+5 42	Brest	Yarmouth road	-4 43	London
Alger	-1 59	Leith	Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. W. P. Thompson & Boulton, British and International Patent and Trademark Agents and Consulting Engineers, 323 High Holborn, London, W.C.; Berridge Street, Leicester; and by W. P. Thompson & Co., 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS).

2652. William John Sage, Walworth, Surrey. "Improved appliances connected with rowing boats for the propulsion thereof."

2658. Augustus Daniel Roth, Blackheath, Kent. "Improvements in apparatus for saving life and property at sea."

2661. Francois Lebacqz, Paris, France. "An improved stool to prevent sea sickness on board of ship."

2698. Gotthilf Henry Heinke, Great Portland Street, Middlesex. "Improvements in and connected with diving apparatus specially applicable to deep sea diving."

2723. George Leslie, Fairfield, Arbroath, Forfar. "Improvements in raising and lowering the screw-propeller of ships, boats, or vessels to allow of such vessels being employed either as steamers or as sailing vessels, or combined."

2728. William Smith, Aberdeen. "Excavating and deepening harbours, channels, canals, rivers, or other similar work by plough-dredging and raising the sand, silt, mud or other soil to the surface with hydraulic pressure."

2756. George Augustus Cochrane, Montreal, Canada. "Improvements in and relating to steamships or other vessels, warehouses, or store-rooms and wagons for carrying or storing fruit or other perishable organic matters."

2799. Robert Thomson and James Watson, both of Liverpool. "Improvements in and appertaining to steam boilers for marine and other purposes."

2800. George Pearson Renshaw, Nottingham. "Improvements in reversing gear of locomotive, marine and other engines."

2808. William Benjamin Barker, Hoboken, New Jersey, U.S.A. "Improvements in signalling by sound in fogs for sea and river navigation." (A communication.)

28. John Colling, Sunderland. "Improvements in the
od of ventilating steamships and sailing vessels."

34. Louis Carsten Niebour, Kingston. "Improvements in
davits and in apparatus for raising and lowering boats
from."

33. Richard James Meek, Southend-on-Sea. "Improve-
s in means and apparatus for propelling vessels by wave and
power, and in applying power thus obtained for pumping and
purposes."

96. William Coppin, Jun., Londonderry, Ireland. "Im-
vements in the propulsion and construction of ships and
ls."

01. Samuel St. Onge Chapleau, New York, U.S.A., and A. L.
n, Montreal, Quebec, Canada. "Improvements in the
ruction of anchors." (A communication.)

59. Johann Pechor, Teplitz, Germany. "An improved
of and appliances for conveying goods from railways or
ways into ships." (A communication.)

35. Johann Benedict Merkl, Berlin. "Improvements in
anism for propelling ships and other vessels." (A
unication.)

AMERICAN.

2634. James F. Guild, Dundee, Forfar, and Arthur E.
st, New York, U.S.A. "A steam-steering apparatus."

2688. Charles R. Peaslee, Louisville, Kentucky, U.S.A. "A
ing case."

2773. George Hayes, New York. "A swimming device."

2842. Daniel Ruggles, Fredericksburg. "A screw-propeller."

3084. Wilber S. Salisbury and William Armstrong, Chicago.
ortable boat."

3184. George E. Whipple, Fort Edward, New York. "A
ulic propeller."

AUSTRIAN.

30. E. Sigl, Vienna. "A machine for unloading corn ships."

BELGIAN.

305. A. Lafargue, Kensington, England. "A hydraulic appa-
for steering vessels."

54699. W. Würdemann, Paris. "An apparatus for shutting off steam in marine engines."

FRENCH.

140212. Hirsch. "Improvements in the shape and construction of hulls, propellers, rudders, and other bodies operated in or by water."

140244. De Courtois de Langlade. "A steam rudder."

140404. Ricarde-Seaver. "A paint for ships' bottoms and other surfaces exposed to sea water."

140449. Stapfer de Duclos & Co., Marseilles. "A ferry boat."

140551. Cooke and Mylchreest. "Screw-propellers."

140611. Bolot, Dijon. "A propeller for steamers."

GERMAN.

14281. J. Lang, Munich. "An engaging and disengaging gear."

14472. H. Königslieben, Hamburg. "An apparatus for checking tickets for omnibuses, steamboats, &c."

14487. W. Cooke and D. Mylchreest, Liverpool. "Securing ships' propellers."

PATENTS PUBLISHED.

5084. December 3rd, 1880. Price 4d. John Samuel White, East Cowes, Isle of Wight. "Improvements in steamships, and in the mode of steering the same." This invention consists, first, in dispensing with the after deadwood and keel of a steamship for a distance of three-eighths of the entire length of the ship forward from the stern, the entire "underwater" portion of the ship gradually diminishing from the point to nothing at the level of the load water-line aft; second, in increasing the depth of the keel at the point of cut off when it is tapered forward at such an angle that if produced aft it would strike below the propeller and rudder, thus enabling the vessel to be beached or docked.

5093. December 7th, 1880. Price 6d. William Cooke and Daniel Mylchreest, Liverpool. "Improvements in and in connection with screw-propellers." The invention consists in arranging and combining the parts of screw-propeller bosses in two or more pieces which are connected together by bolts or nuts. The blades of the propellers are secured to the pieces of the boss in any desired manner.

LY ABSTRACT OF NAUTICAL NOTICES.

PLACE.	SUBJECT.
East Coast—Humber River— Brough	Re-exhibition of lights.
Vest Coast—Liverpool Bay	Alteration in lights and buoyage.
East Coast—Dublin Bay—Kish Bank	Proposed alteration in position of light-vessel.
—Terschelling Bank	Light established.
Weser River—Brinkamahof Fort	Light discontinued.
" Rother Sand	Lighthouse in construction and temporary light.
Jade River—Genius Bank	Gas-buoy withdrawn, light-vessel replaced.
Elbe River—Light-vessel No. 4	Alteration in position.
Eider River—Inner light- vessel	Position.
FRANCE—Sound—Copenhagen	Torpedo ground.
" "	Alteration in buoyage.
Schleswig-Holstein—Keil Fiord	New harbour light.
—Kitzenber	
Imar Sound—Grimskar	Additional light and harbour lights.
and Island—East Coast	Reported sunken danger.
North Coast—Gravelines	New tidal light.
" Baie de St. Brieuc	New light.
—Grand Léjon Rock	
East Coast—Vigo Bay—Rondana Shoal	Position of buoy.
ANTIC—Cape Finisterre	Floating wreck.
NEAN—France—Marseille— Planier Islet	Particulars of new light.
" Barcarès	New harbour light.
(Port St. Laurent)	
Algeria—Port Cala	Colour of port light.
Sicily—Port Trapani	Alterations in light.
—Palumbo Islet	
" Levanzo Islet	A dark sector introduced.
—Grosse Point	
" Palermo	Extension of breakwater.
" Catania	Position of bell-buoy, alteration in sector of mole light.
Italy—West Coast— Civita Vecchia	Obstruction removed.
Adriatic—Gulf of Venice	Alterations in light.
—Piave Vecchia	
" Gulf of Venice	A channel closed.
—Port Pola	
" Istria—Civran Shoal	New buoy.
Dalmatia—Port Spalato	Buoyage.
Greece—Gulf of Corinth	Torpedoes removed.
Candia or Crete—Suda Bay	Chain obstruction removed.
—Odessa	Extension of breakwater.
Kertch Straît	Light-vessel replaced, dredging resumed.
Gulf of Suez—Suez Bay—Kal- ah-Kebireh	Beacon on shoal.

MONTHLY ABSTRACT OF NAUTICAL NOTICES—*Continued.*

No.	PLACES.	SUBJECT.
269	RED SEA—West Coast—'Asab Bay	Reported danger.
270	INDIA—West Coast—Bombay Harbour—Tuckers Patch	New beacon, buoy withdrawn.
271	" " Ratnigiri	Light altered in colour.
272	" " Karwar	Buoy adrift.
273	" Coromandel Coast—Arinogham and Pulicat	Alteration of lights.
274	" Bay of Bengal—False Point	Occasional obscuration of light by fog.
275	EASTERN ARCHIPELAGO—Sumatra—Pisang Harbour	Proposed light on Pulo Pisang.
276	" " Java—Batavia Road—Edam Island	New light; Alkmaar light discontinued.
277	" " Madura Strait Probolinggo	New harbour light.
278	" " Sulu Sea—Borneo	Reported dangers.
279	CHINA SEA—Gulf of Siam—Bankok River	New light-vessel.
280	" "	Reported dangers.
281	CHINA—East Coast—Yangtse-kiang	Wreck near Amherst rock; beacons on Wusung bar.
282	AUSTRALIA—South Coast—Port Phillip Entrance	Leading beacons.
283	NEW ZEALAND—North Island	Reported dangers; proposed light on Cape Egmont.
284	" Middle Island—Grey River	Position of harbour light altered.
285	SOUTH PACIFIC—New Caledonia—Amédée Islet	Intended leading light.
286	UNITED STATES—Pacific Coast—Oregon—Columbia River	Fog-signal on Cape Disappointment discontinued.
287	" " "	Establishment of whistling buoy at entrance.
288	SOUTH AMERICA—Rio de la Plata—English Bank	Intended light on north end.
289	" Brazil—Cape Marco	Alterations in light.
290	" " Bahia—Port San Antonio	Range of light; buoyage of bank.
291	" " Abrolhos Islands	Light re-exhibited.
292	" French Guiana—Cayenne—Enfant Perdu	Light visible all round horizon.
293	WEST INDIES—Venezuela—Puerto Cabello	Alteration in lights.
294	" New Granada—Magdalena River	Bar constantly changing.
295	GULF OF MEXICO—Yucatan—Progreso Point	Alteration in light.
296	UNITED STATES—Florida—Amelia Island	Light re-exhibited.
297	" South Carolina—Port Royal Sound	New leading lights.
298	NEWFOUNDLAND—South Coast—Fortune Bay—Harbour Breton	Rocky Point lighthouse destroyed.
299	CANADA—Prince Edward Island—Bedegue Harbour—Indian Spit	New light.
300	CANADA—Gulf of St. Lawrence—Miramichi Bay—Fox Islands	Alterations in leading lights.
301	" " "	Provision depôts closed.
302	" River St. Lawrence—Bicquette and Green Islands	New fog-signals.
303	" Lighthouses in Gulf and River St. Lawrence	Change of colour.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

234.—ENGLAND.—*East Coast.*—*Humber River.*—*Re-Exhibition of Lights at Brough.*—With reference to Notice 80, p. 241, in consequence of recent changes in the channel round Whitton ness, the two lights at Brough, about 10 miles above Hull, are now re-exhibited.

235.—ENGLAND.—*West Coast.*—*Liverpool Bay.*—On 16th August, 1881, the following alterations will be made in the lights and buoyage, Liverpool bay :—

(1.) BIDSTON LIGHT will be so masked that to vessels approaching from the westward, it will disappear on being brought to bear S.S.E. $\frac{1}{4}$ E., remaining masked over all the eastern part of Liverpool bay.

(3.) CROSBY LIGHT will be so masked as to disappear similarly when brought to bear S.S.E., remaining masked over all the eastern part of Liverpool bay.

(2.) LEASOWE LIGHT will be so masked that to vessels approaching from the northward it will disappear when brought to bear S.E. $\frac{1}{4}$ E., remaining masked over all the southern part of Liverpool bay.

(4.) CROSBY LIGHT-VESSEL will be moved $1\frac{1}{4}$ cable N.W. $\frac{3}{4}$ W. from her present position.

(5.) The *pillar bell* beacon (formerly moored in the fairway of Queen channel), painted red and marked C. 3, will be placed off Askew spit, one cable S.E. by E. from the present position of red can buoy with perch C. 3—in lieu of the said buoy.

(6.) An additional *nun* buoy, painted black and marked Q. 4, will be placed 180 fathoms N.N.W. $\frac{1}{2}$ W. from Formby light-vessel.

(7.) Two additional red *can* buoys will be placed at the south-west side of Queen channel—one midway between the present red can buoys Q. 2 and 3—the other midway between buoys Q. 3 and 4. The first additional buoy will be marked Q. 3, the

present Q. 3 will become Q. 4; the second additional buoy will be marked Q. 5, the present Q. 4 will become Q. 6.

Note.—The intended masking limits of Bidston and Leasowe lights pass one mile westward of the Bar light-vessel. The masking limit of Crosby light passes over Zebra buoy, which is situated two miles eastward of the Bar light-vessel. Approaching the Bar light-vessel her single fixed white light will be visible, while the fixed white lights of Bidston, Leasowe, and Crosby lighthouses will be obscured. The change in the position of Crosby light-vessel will not alter the present line of bearing of the Bar, Formby, and Crosby light-vessels. Therefore vessels entering Queen channel and passing northward of the Bar light-vessel, will have Formby and Crosby light-vessels ahead nearly in line, and steering for Formby light-vessel will clear the shoal water on the south side of the bar. The alteration in the position of Crosby light-vessel is to facilitate her use as a fairway or mid-channel guide for vessels following the directions contained in the "Act for Preventing Collisions in the Sea Channels leading to the Mersey," and in Article 21 of the General Regulations for Preventing Collisions at Sea, which directs certain vessels to keep to that side of the channel which lies on the starboard side of such vessels. In following the above directions, it will be unnecessary in the future for inward bound vessels avoiding the courses of the outward bound to hug the edge of Burbo bank near Askew spit. The substitution of the Pillar beacon for the present buoy off the elbow of Burbo bank will serve to verify a vessel's position, while maintaining a mid-channel course between Askew spit and Crosby light-vessel. The new position of black nun buoy Q. 4, will caution outward bound vessels passing northward of Formby light-vessel to steer to the westward in order to clear Spit buoy Q. 3 (black). The additional red can buoys on the edge of Little Burbo will indicate to inward vessels, which, meeting the outward bound at this point, may have to alter course to starboard, how far they may proceed in that direction before resuming the proper inward course. *Variation*, $20\frac{1}{2}^{\circ}$ W.

236.—*IRELAND.*—*East Coast.*—*Dublin Bay.*—*Kish Bank Light-Vessel.*—*Intended Alteration in Position.*—On or about 1st October,

following alteration will be made in the position of Kish vessel:—The vessel will be moved one mile E. $\frac{1}{2}$ S., moored in 13 fathoms at low water spring tides, with ag mark, bearings and distances, viz.:—Mapas obelisk and Muglins beacon, W. $\frac{3}{4}$ S.; Howth Bailey lighthouse, E., distant $5\frac{1}{2}$ miles; Poolbeg lighthouse, N.W. by distant $8\frac{3}{4}$ miles; Kingstown East pier, W. by N. N.W., distant 1 mile; Kish bank buoy, No. 1, W.S.W., distant $1\frac{1}{2}$ miles; Kish bank light-vessel, South, distant $17\frac{1}{10}$ miles; lat. $53^{\circ} 19' 20''$ N., long. $5^{\circ} 55' 15''$ W. Variation, $21\frac{1}{2}^{\circ}$ W.

NORTH SEA.—*Light-Vessel on Terschelling Bank.*—With Notice 166, p. 486, on the proposed placing a light-vessel on Terschelling bank, with Brandaris lighthouse on Texel island bearing S.S.E. $\frac{1}{2}$ E., distant 16 miles, the vessel is now in position, and the light shown as indicated in

NORTH SEA.—*Weser River.*—*Brinkamahof Fort Light* discontinued.—The light on the temporary landing pier of Brinkamahof is discontinued.

NORTH SEA.—*Weser River.*—*Rother Sand.*—*Lighthouse in construction, Provisional Light Exhibited.*—The foundation of the lighthouse has been laid in a depth of 26 feet at low water over (Red) sand, Weser River entrance, with white buoy bearing W.S.W., distant about 5 cables. The foundation, of plate iron, is painted dark red. Position approximately lat. $53^{\circ} 50' 50''$ N., long. $8^{\circ} 5' 50''$ E. A fixed white light is exhibited about 15 feet above the foundation.

NORTH SEA.—*Jade River.*—*Genius Bank.*—The gas buoy withdrawn, and the light-vessel replaced in position.

NORTH SEA.—*Elbe River.*—*Elbe Light-Vessel No. 4.*—*In Position.*—In consequence of the sands below Cuxhaven shifted between the northern channel and the new star Kugel beacon, the following alteration has been made in the position of Elbe light-vessel No. 4 (*Neptun*):—The vessel has been moved $2\frac{1}{2}$ cables in a N.W. $\frac{1}{3}$ W.

NORTH SEA.—*Eider River.*—*Inner Eider Light-Vessel.*—

Position.—The light-vessel is now moored off Alte Süder Eider. Position, lat. $54^{\circ} 14' 20''$ N., long. $8^{\circ} 34' 40''$ E.

Note.—The course from the fairway buoy (red) to Inner Eider light-vessel is S.E. $\frac{3}{4}$ E.; on the bar seaward of the light-vessel there is a depth of about 10 feet at ordinary low water.—*Variation*, $14\frac{1}{4}^{\circ}$ W.

243.—BALTIC ENTRANCE.—*The Sound.*—*Torpedo Ground near Copenhagen.*—A beacon light is exhibited, as in former years, to indicate the locality where Torpedo experiments are being made, between Provstenen and Mellem forts, near Copenhagen.

244.—BALTIC ENTRANCE.—*The Sound.*—*Alteration in Buoyage Southward of Copenhagen.*—The following alterations have been made in the buoyage of the channel southward of Copenhagen:—
(1.) The floating beacon with three brooms turned downwards on the south-west side of Middle ground, Konge deep, is replaced by a white sharp conical buoy with three brooms turned downwards.
(2.) The sharp conical buoy with three brooms turned upwards marking North Rose, is replaced by a floating beacon with red perch and three brooms turned upwards. (3.) The floating beacon southward of Afland (Amager) point, with a broom turned downwards below a ball, is altered to a broom turned upwards. (4.) A floating beacon with white perch and two brooms turned downwards is moored in 6 fathoms water, on the western side of Lille ground, 2 miles S. by W. from the northern sea mark of this shoal. (5.) The floating beacon with white perch and red ball, westward of Bred ground and about $4\frac{1}{2}$ miles southward of Drogden light-vessel, is withdrawn. *Variation*, $11\frac{1}{4}^{\circ}$ W.

245.—BALTIC.—*Schleswig-Holstein.*—*Kiel Fiord.*—*Harbour Light on Kitzenberg.*—Exhibited from the western deviation beacon on Kitzenberg, eastern side of Kiel fiord. It is a *fixed green* light (Fresnel's system), elevated about 24 feet above the sea; visible in the channel of the fiord through an arc of 182° or between the bearings of S.W. $\frac{3}{4}$ S. and N.E. $\frac{1}{8}$ N. A ray of *white* light is also shown inshore, in the direction of Möltenort. *Variation*, 13° W.

246.—BALTIC.—*Kalmar Sound.*—(1.) *Additional Light on Grimskär.*—Exhibited about 20 yards north-east of the fixed and flashing light; it is a *fixed* light, showing *white* between the bearings of

E. (through west) and S. 80° W. ; red between S. 80° W. and 90° W. ; and white between S. 60° W. (through south) and S. E. ; elevated 41 feet above the sea.

etc.—The limits of the sectors are however not distinctly marked.

6.) *Harbour Lights at Kalmar.*—Two harbour lights are now exhibited on the new harbour quay at Kalmar ; the outer light is red ; the inner, fixed green.

With these lights in line, a vessel of 12 feet draught will clear shoals between Grimskär and Prästör reef, until the two lights Grimskär are in line, which should be then kept so, until near the sea marks in Kalmar road, then bringing in line the two lights on the old harbour quay at Kalmar, and which lead into the harbour. Variation, 10° W.

7.—*BALTIC.*—*Öland Island.*—*East Coast.*—*Reported Sunken Shoal Eastward of Waholm Point.*—Reported as lying about 1 mile eastward of Waholm point, east coast of Öland island. This shoal (*Atalanta shoal*) on which the Swedish steam-vessel *Atalanta* struck on her passage from London to Stockholm, is reported to have a depth of 13 feet, bottom sand and pebbles, and to be marked with the following bearings, viz. :—Löt church, W. $\frac{1}{4}$ S. ; Forsholm church, N.W. $\frac{1}{4}$ W. Position approximate, lat. 56° 57' 0" N., long. 17° 2' 30" E. A small buoy was placed on the shoal by the commander of the *Atalanta*, and a Swedish Government steam-vessel has been dispatched to examine the locality. Mariners navigating in the vicinity of *Atalanta shoal*, are recommended to keep 2 or 3 miles seaward of the reported position. Variation, 10° W.

8.—*FRANCE.*—*North Coast.*—*Gravelines Harbour.*—*Tidal Light on North-East Pier.*—A fixed green light is shown at the extremity of the north-east pier of Gravelines harbour, during the spring tides there is sufficient depth of water for vessels to enter the harbour. This light will continue to be shown until the completion of the north-west pier. N.B.—This notice amends No. 177, 1869.

9.—*FRANCE.*—*North Coast.*—*Baie de Saint Brieuc.*—*Light on Grand Léjon Rock.*—Exhibited from the tower constructed of

masonry, which has been recently built higher, on Grand Léjon rock, Baie de Saint Brienc. The light is alternately *fixed and flashing* at intervals of *twenty-five seconds*; it shows *red* through an arc of 43° , between the bearings of $N. 34^{\circ} E.$ and $N. 77^{\circ} E.$ —covering the dangers included between Caffa shoal and St. Quay rocks; it is obscured though an arc of 67° , between the bearings of $N. 9^{\circ} E.$ and $N. 58^{\circ} W.$ —covering the dangers included between Rohein rocks and Grande Livière; in all other directions, northward and southward, it shows white. The light is elevated 52 feet above high water, and 76 feet above the rock. The fixed white light should be visible from a distance of 12 miles; the flashing white light 17 miles—the fixed red light 8 miles; and the flashing red light 12 miles. Position as given, lat. $48^{\circ} 45' 0'' N.$, long. $2^{\circ} 40' 0'' W.$ Variation, $19^{\circ} W.$

250.—SPAIN.—*West Coast.*—Vigo Bay.—*Position of Rondaña Shoal Buoy.*—With reference to Notice 213, p. 574, on placing a *nun* buoy, painted black and surmounted by a white ball, in 6½ fathoms water, on the outer edge of Rondaña shoal, Vigo bay; the buoy is moored on the outer edge of the shoal westward of Toralla islet, and is locally known as Rondaña shoal.

251.—NORTH ATLANTIC OCEAN.—*Floating Wreck Northward of Cape Finisterre.*—A French ship reports having passed the hull of a vessel, apparently of large tonnage, some timbers visible, head and stern cut down, in lat. $44^{\circ} 43' N.$, long. $9^{\circ} 27' W.$ —about 110 miles northward of cape Finisterre. This wreck presents a danger to shipping. In this locality the drift current may be considered to set in an E.S.E. direction (*true*) at the rate of about one mile an hour.

252.—MEDITERRANEAN.—*France.*—*Approach to Marseille.*—*Light on Planier Islet.*—With reference to previous Notice it is probable that during the month of September, 1881, Planier islet light will be transferred to the new lighthouse, which has been constructed about 27 yards north-east of the old lighthouse. The new light will be a *flashing light (electric)* with *three white flashes and one red flash*; the three white flashes forming one group will follow each other at intervals of about *three seconds*, and the groups of white flashes will be separated by an interval of about *twelve*

seconds, in the middle of which interval the red flash will appear. The light will be elevated about 203 feet above the sea, and visible from a distance of at least 26 miles. Further Notice will be given as to the date of the exhibition of the new light.

253.—MEDITERRANEAN.—*France.*—*Harbour Light at Barcarès (Port of St. Laurent).*—On 1st July, 1881, a harbour light would be exhibited from an iron standard with shed, surmounting a base of masonry (7 feet high), fronting the village Barcarès, port of St. Laurent; it is a *fixed red* light, elevated 24 feet above high water, and visible from a distance of 5 miles. Position, lat. $42^{\circ} 47' 20''$ N., long. $3^{\circ} 2' 30''$ E.

254.—MEDITERRANEAN.—*Algeria.*—*Colour of Port Gala Light.*—It is a *fixed white* light, not a fixed red light as hitherto stated.

255.—MEDITERRANEAN.—*Sicily.*—*Port Trapani.*—*Alterations in Palumbo Islet Light.*—The fixed green light is discontinued, and in place thereof a *fixed white* light is exhibited, visible through the arc included between Grosso point lighthouse and Porcelli rocks; elevated 55 feet above the sea, and visible from a distance of 14 miles. The lighthouse is circular in shape and coloured white, with keeper's dwelling, octagonal and of one storey, attached.

256.—MEDITERRANEAN.—*Levanzo Island.*—*Grosso Point Light.*—*Dark Sector.*—The light on Grosso point, Levanzo island, is obscured over Porcelli rocks through an arc of 30° , or between the bearings of N. 74° W. and S. 76° W. The light will be thus obscured along the coast of Sicily north-eastward of port Trapani.

257.—MEDITERRANEAN.—*Sicily.*—*Port of Palermo.*—*Extension of Southern Breakwater.*—The new breakwater fronting Castellare, port of Palermo, now extends south $2\frac{1}{2}$ cables from its northern extremity, and thence S.W. by W. $\frac{1}{2}$ W. one cable towards Health Office point—thus closing the channel that previously existed southward of this breakwater. A *fixed green* light visible 2 miles is exhibited from the north end of the breakwater. Variation, $10\frac{1}{4}^{\circ}$ W.

258.—MEDITERRANEAN.—*Sicily.*—*Catania.*—*Change in Position of Bell Buoy, Alteration in Sector of Mole Light.*—Consequent on the works in progress at the port of Catania, the bell buoy has been moved 175 yards to the southward, and now lies with the

following bearings and distances, viz. :—Old mole lighthouse (red light), N. 23° W., distant 5 cables; Sciara Biscaria lighthouse, N. 51° W., distant nearly 5 cables. Also, the red light on the Old mole is not visible eastward of the bearing N. 23° W.

Note.—Vessels entering the port of Catania should pass southward of the bell buoy, and at night, can steer in when the red light on the old mole is seen, keeping it a little on the port bow. *Variation*, 10° W.

259.—MEDITERRANEAN.—*Italy.*—*West Coast.*—*Civita Vecchia.*—*Obstruction in Southern Entrance Removed.*—With reference to Notice 188, p. 490, on the southern entrance to the port of Civita Vecchia being greatly obstructed by the wreck of the British steam-vessel *Linda*; this wreck has been floated, thus rendering the southern channel again clear.

260.—MEDITERRANEAN.—*Adriatic.*—*Gulf of Venice.*—*Alterations in Piave Vecchia Light.*—A new fixed white light is exhibited, elevated 146 feet above high water, and visible from a distance of 18 miles. The light heretofore exhibited would at the same time be discontinued.

261.—MEDITERRANEAN.—*Gulf of Venice.*—*Port Pola.*—*Channel closed between St. Andrea and St. Caterina Islets.*—In June, 1881, the channel between St. Andrea and St. Caterina islets, at the entrance of port Pola, would be closed by the anchorage of a vessel for experimental purposes. The channel is therefore closed until further Notice, and all vessels must use the channel southward of St. Andrea islet.

262.—MEDITERRANEAN.—*Adriatic.*—*Istria.*—*Buoy Marking Civran Shoal.*—A buoy, painted white, surmounted by a staff and frame ball, has been moored in $3\frac{1}{2}$ fathoms water, to mark the seaward extremity of Civran shoal, southward of port Cervera, with the following bearings, viz. :—Verteneglio church steeple, N.E. by N.; Torre church steeple, E.N.E.; Parenzo church steeple, S. by E. $\frac{1}{2}$ E. *Variation*, 11° W.

263.—MEDITERRANEAN.—*Dalmatia.*—*Port Spalato.*—*Buoys.*—Seven wooden beacons, in the form of quadrangular pyramids, painted white, with the depth of water in which they are moored in black figures on their sides, have been placed to mark certain

als within port Spalato. One of these beacons is moored on shoal near and almost opposite the magazine, in 11 feet water; the other six are moored on the shoals extending off from near the railway station to the mole in $15\frac{1}{2}$, $16\frac{1}{2}$, $15\frac{1}{2}$, $17\frac{1}{2}$, and 9 feet respectively at low water.

64.—MEDITERRANEAN.—Greece.—Gulf of Corinth.—Torpedoes removed.—With reference to previous Notice on torpedoes having been laid down for exercise in the gulf of Corinth, between Rhio and Antirrhio, the torpedoes have been removed.

65.—MEDITERRANEAN.—Candia or Crete.—Suda Bay.—Chain cable Removed from Northern Entrance.—With reference to Notice, p. 575, the chain cable extended from the northern shore of the entrance to Suda bay to the islet opposite (Suda), in order to the passage of vessels, has been removed.

66.—BLACK SEA.—Odessa.—Extension of Breakwaters and Addition of Lights.—The seaward breakwater, projecting from Vorontzovski mole, has been completed by its extension in a N.W. direction for a distance of about 350 yards. A new breakwater, the south-east end of which bears S.W. by S. distant at $1\frac{1}{2}$ cable from the extremity of the seaward breakwater, is under course of construction, and already extends in a north-westerly direction for about 3 cables, the south-eastern portion being completed. At the entrance between the seaward and new breakwaters, the depths are from 6 to 8 fathoms. A buoy is moored at the south-east extremity of the new breakwater. There are beacons from the extremity of Vorontzovski mole three red lights, placed diagonally; and from the south-east end of the new breakwater two green lights, placed vertically. Variation, 3° W.

67.—BLACK SEA.—Kertch Strait.—(1.) Tuslinski Light-vessel moved in Position.—Tuslinski (Kertchenski) light-vessel has been moved in position near the south-west extreme of Tuzla bank, Kertch strait; and the summer sea-marks have been replaced in Kertch strait, and in the old Yenikale channel.

(2.) Yenikale Channel.—Dredging Operations resumed.—On the opening of navigation in 1881 dredging operations would be resumed in the deep channel of Yenikali (Enikolski), and consequently the navigation would be closed until special notice is

given. During this time, vessels of not more than fourteen feet draught can use the old channel, which (entering the sea of Azov) is marked by three black buoys on the starboard-hand, and by two red buoys on the port-hand.

Note.—Telegraphic information has been received that the Russian authorities have granted permission to all vessels to pass through the deep channel of Yenikale two hours daily—from 2^h to 4^h p.m.

268.—RED SEA.—*Gulf of Suez.*—*Suez Bay.*—*Beacon on Kalah-Kebireh Shoal.*—The beacon, 30 feet high, consists of a cairn of stones 8 feet high and black in colour, surmounted by a mast and triangle painted red; it is situated about half a cable northward of the position of the old beacon, or N. $\frac{1}{2}$ E. from the southern extremity of the reef, distant $1\frac{1}{2}$ cable. Variation, $4\frac{1}{2}^{\circ}$ W.

269.—RED SEA.—*West Coast.*—*'Asab Bay.*—*Sunken Danger Northward of Entrance.*—Information relative to a sunken danger lying about 5 miles northward of the eastern entrance of 'Asab bay. This danger (*Fieramosca shoal*), composed of sand and coral, with a least depth found on it of 15 feet at low water, lies with the following bearings and distance, viz.:—Eastern extreme of Fátimah islet, S. 17° E., distant 5 miles; Sanáb-bór islet, S. 75° W. About three-quarters of a cable northward of the above position, the Italian vessel, *Ettore Fieramosca* anchored in 26 feet over sand; and about 2 cables S.S.E. of her anchorage, another shoal patch, with 18 feet on it at low water, was found. Variation, $4\frac{1}{2}^{\circ}$ W.

270.—INDIA.—*West Coast.*—*Bombay Harbour.*—*Beacon on Tuckers Patch, Buoy Withdrawn.*—The beacon is a pillar constructed of masonry, surmounted by a small platform with railings, elevated 30 feet above high water spring tides; it is painted red and black in horizontal bands, and is situated with the following bearings and distances, viz.:—Cross island flagstaff, N.W. by W. $\frac{1}{4}$ W., distant $1\frac{1}{2}$ mile; Middle ground flagstaff, S.W. by W. $\frac{1}{8}$ W., distant $1\frac{1}{6}$ miles.

Note.—Vessels of $23\frac{1}{2}$ feet draught can pass southward of Tuckers beacon, at the distance of one cable. The white buoy, which had previously marked Tuckers patch, would be withdrawn.

271.—INDIA.—*West Coast.*—*Ratnagiri.*—*Alteration in Colour of light.*—With reference to Notice 148, p. 412, on the intended alteration in the colour of Ratnagiri light—a *fixed white* light was exhibited on the night of the 1st June, visible from a distance of about 15 miles.

272.—INDIA.—*West Coast.*—*Karwar or Sadashivgad.*—*Breaking drift of Karwar Rock Buoy.*—The buoy marking the Karwar Rock (Gudsar sunv.), lying to the W.N.W. of Elephant island, has been broken adrift, and it will be impracticable to replace it during the present monsoon.

273.—INDIA.—*Coromandel Coast.*—*Armogham and Pulicat.*—With reference to Notice 149, p. 412:—

(1.) The new light at Armogham is exhibited; it is a *revolving white* light, showing a *flash every twenty seconds*, visible from a distance of 14 miles.

(2.) And the following alteration has been made at Pulicat; the light is *fixed white*, instead of red as formerly, and visible 14 miles.

274.—INDIA.—*Bay of Bengal.*—*False Point.*—*Occasional Obscuration of Light by Fog.*—During the months of January, February, and March, the prevalence of low-lying, heavy fog—over the land which lies between the lighthouse and the sea—occasionally interferes with the proper visibility of the light, and, at times, may even obscure it, although the weather at sea may be clear. Mariners should, therefore, be specially cautious when approaching the light during the first quarter of the year, and use the lead continually.

275.—EASTERN ARCHIPELAGO.—*Sumatra.*—*Pisang Harbour.*—*Proposed Light on Pulo Pisang.*—To be established on the summit of Pulo Pisang (Pisang Kroé), Pisang harbour. Position, lat. 9° S., long. 103° 55' E.

276.—EASTERN ARCHIPELAGO.—*Java.*—*Batavia Road.*—*Light on Edam Island, Discontinuance of Alkmaar Island Light.*—The light on Edam island, is *fixed white*, elevated 169 feet above high water, and visible from a distance of 17 miles, except where obscured by islands in the bay. The temporary light on Alkmaar island is discontinued.

277.—EASTERN ARCHIPELAGO. — *Java.* — *Madura Strait.* —

Harbour Light at Probolingo.—With reference to previous Notice on the proposed establishment of a harbour light at Probolingo, south side of Madura strait; the lighthouse is in course of construction on the western harbour mole, and the light will be fixed white. Position, lat. $7^{\circ} 48' S.$, long. $118^{\circ} 12' E.$

278.—EASTERN ARCHIPELAGO.—*Sulu Sea.*—*Borneo*—(1.) *Sunken Danger Eastward of Bo-aan Islet.*—Report of the existence of a sunken danger lying about 2 miles eastward of Bo-aan islet, northern approach to Sandakan harbour. This rock, with less than 3 fathoms on it at low water, lies with the following bearings, viz.:—Bo-aan islet summit, west; Langaan islet summit, $S. 18\frac{1}{2}^{\circ} E.$ Position approximate, lat. $6^{\circ} 18' 0'' N.$, long. $118^{\circ} 10' 0'' E.$

(2.) *Sunken Danger Northward of Sandakan Harbour.*—Report of the existence of a sunken danger lying about 10 miles northward of the entrance to Sandakan harbour. This dangerous rock with less than 6 feet over it at low water, lies with the following bearings, viz.:—Taganae islet summit, $N. 77\frac{1}{2}^{\circ} E.$; Bahala islet summit, $S. 10^{\circ} W.$ Position approximate, lat. $5^{\circ} 58' 30'' N.$, long. $118^{\circ} 13' 0'' E.$ Variation, $2^{\circ} E.$

279.—CHINA SEA.—*Gulf of Siam.*—*Light-Vessel at Menam Chau-Phya (or Bangkok River) Entrance.*—A light-vessel has been placed at Bangkok river entrance, on the stones known as the Middle or Second Sunken Junk, situated abreast West point, and formerly marked by a conical buoy. The light is fixed red. The vessel with mast carrying a ball, is painted red; she is moored head and stern, and may be passed on either side.

280.—CHINA SEA.—*Gulf of Siam.*—*Sunken Rocks.*—(1.) Information respecting the existence of a sunken rock lying in the northern part of the channel between Koh Tron (Phu-Quoc) and Water island, eastern shore of the gulf of Siam. This danger (*Cape Clear rock*) on which the British vessel *Cape Clear* is stated to have struck, was found by a boat sent to examine the locality, to have 4 feet water over a flat summit, yellow in colour, and about 10 feet square; it lies with the following bearings, viz.:—East extreme of Water island, $N. 50^{\circ} W.$; South extreme of Water island, $S. 73^{\circ} W.$; N.W. point, Koh Tron, South. At the distance of about half a cable southward of Cape Clear rock, a

depth of 14 feet was found, and at about three-quarters of a cable, 23 feet.

(2.) Information respecting the existence of a sunken rock lying about 27 miles westward of Koh Rong, eastern shore of the gulf of Siam.—This rock (*Jan Peter*) on which the German barque *Jan Peter* grounded at 8 a.m., on 21st December, 1880, is stated to have 2 fathoms water over it, and as seen from aloft was estimated to be about 2 ships lengths in extent; the following bearings were observed from the vessel when aground, viz.:—Koh Kong summit, N.N.E.; Koh Rong summit, E. $\frac{1}{4}$ S.; Rong Sam Lem summit, E. by S. About 2 hours after grounding, the tide had risen about 10 feet, and the vessel backed off the danger, striking heavily from the easterly swell. The above bearings would place *Jan Peter* rock about 22 miles W.S.W. of Koh Samit (nearest land), or in lat. $10^{\circ} 45' N.$, long. $102^{\circ} 42' E.$, but from the nature of the account received, the position must be regarded as approximate. Mariners therefore should navigate in the vicinity with great caution. Variation, $2^{\circ} E.$

281.—CHINA.—East Coast.—Yangtse-Kiang Entrance.—(1.) *Wreck near Amherst Rocks*.—With reference to Notice to the wreck of the British barque *Chinaman* sunk in 5 fathoms water off the entrance to the Yangtse-Kiang; the masts have been blown out of the wreck, and at low water a drag 5 fathoms deep failed to foul the hull, which is settling in the mud. Vessels are cautioned not to anchor near the position of the wreck, which lies with Amherst rocks bearing N. $37^{\circ} E.$, distant 7 miles.

(2.) *Wusung Inner Bar Beacons*.—On or about 15th May, 1881, the Wusung inner bar beacons would be replaced by new ones indicating the line of deepest water across the bar, which at the present time is on the bearing of N. $88^{\circ} E.$ from the flagstaff in front of the house occupied by the Great Northern Telegraph Company.

Note.—After the 15th May, 1881, vessels are not to anchor within half a cable to the southward of the line of the beacons, nor between this line and the French godowns. Variation, $2\frac{1}{4}^{\circ} W.$

282. — AUSTRALIA. — South Coast.—Port Philip Entrance.—*Leading Beacons for Deep Water Channel*.—The shoal patches of

27, 28, and 29 feet water in the fairway of the entrance to point Philip, being dangerous to vessels of heavy draught, two leading beacons have been erected indicating a deeper channel between the Heads. These beacons—the outer red and the inner white—are situated in Lonsdale bight, nearly $1\frac{2}{10}$ mile from point Lonsdale and $1\frac{6}{10}$ mile from Queenscliffe low lighthouse, and kept in line bearing N.N.W. $\frac{1}{4}$ W., lead in about midway between Lightning and Corsair rocks, with not less than 42 feet at low water spring tides.

Caution.—Vessels approaching from the westward, before bringing the leading beacons in line, should keep point Lonsdale lighthouse well open westward of the flagstaff, to ensure clearing Lightning rocks. Vessels approaching from the eastward will know that with the leading beacons in line, they are eastward of Lightning rocks.

283. — NEW ZEALAND. — North Island. — East Coast. — (1.) *Reported Sunken Danger off Cape Kidnappers.*—A reported sunken danger lies south-eastward of cape Kidnappers, southern side of Hawke bay. This danger (*Mercia shoal*) on which the barque *Mercia* is stated to have touched lightly, lies with cape Kidnapper bearing N. 70° W., distant about one mile—the lead just before the vessel touched gave 7 fathoms water. The position of this danger must be regarded as approximate, mariners are recommended therefore not to approach cape Kidnappers nearer than 2 miles.

(2.) North Island.—West Coast.—Rangitiki River Entrance.—*Pilot Service Discontinued.*—The pilot service at Rangitiki river entrance is discontinued, and the bar and danger signals are no longer shown from the signal station.

(3.) *Intended Light on Cape Egmont.*—A lighthouse is in course of erection on cape Egmont, and it is anticipated the light will be ready for exhibition during the month of August, 1881; it will be a *fixed white* light, visible all round seaward as far as the land will allow; elevated 97 feet above high water, and visible from a distance of about 15 miles. The lighthouse is situated on a knoll about 240 yards from high water mark on cape Egmont. Position approximate, lat. $39^{\circ} 17' 0''$ S., long. $173^{\circ} 46' 0''$ E. Further notice will be given.

284.—NEW ZEALAND.—*Middle Island.*—*West Coast.*—*Grey River Entrance.*—*Alteration in Position of Harbour Light.*—The fixed white light previously shown from the North side of Grey river entrance, is now exhibited from the south side of the entrance, from a new flagstaff on the south side of the south training wall.

285.—SOUTH PACIFIC.—*New Caledonia.*—*Intended Leading Light on Amédée Islet.*—On 1st September, 1881, a leading light will be exhibited from a lighthouse erected on Amédée islet, within Bulari pass, south coast of New Caledonia. It will be a *fixed red light*, elevated 47 feet above high water, and visible from a distance of 6 miles. The lighthouse will consist of a foundation of masonry (29 feet above low water level), octagonal in shape and of a white colour, surmounted by an iron column 20 feet in height.

Note.—This light kept in line with the old light (fixed white) bearing N. $38\frac{1}{2}$ E. will lead in mid-channel through the northern Bulari passage. *Variation*, $10\frac{1}{2}^{\circ}$ E.

286.—UNITED STATES.—*Pacific Coast.*—*Oregon.*—*Columbia River Entrance.*—*Cape Disappointment Lighthouse.*—*Discontinuance of Fog Signal.*—On 1st September 1881, the fog-signal (bell) at cape Disappointment (Hancock point) north side of Columbia river entrance, will be discontinued.

287.—UNITED STATES.—*Pacific Coast.*—*Oregon.*—*Whistling Buoy off Mouth of Columbia River.*—The whistling buoy, heretofore moored off the south channel of the Columbia river, has been removed, and is now moored off the north channel, $2\frac{3}{4}$ miles from the bar, in 15 fathoms of water, with cape Disappointment lighthouse bearing N.E. by E.; point Adams lighthouse, E. $\frac{1}{2}$ S.; Tilamook rock lighthouse, S.E. $\frac{1}{2}$ S.

288.—SOUTH AMERICA.—*Rio de la Plata.*—*English Bank.*—*Intended Light on North End.*—Probably about the end of March, 1882, a light will be exhibited from a lighthouse now in course of construction on the north end of English bank, Rio de la Plata:—The light will be *fixed white*, elevated 102 feet above high water, and visible from a distance of 15 miles. The lighthouse, constructed of iron, is situated about 11 miles southward of Flores islet

lighthouse. Position approximate, lat. $35^{\circ} 7' 30''$ S., long. $55^{\circ} 54' 45''$ W.

289.—SOUTH AMERICA.—Brazil.—*Lake dos Patos*.—Alterations in *Cape Marco Light*.—The former small light has been replaced by a fixed white light, elevated 54 feet above the sea (47 feet above the ground), and visible from a distance of 12 miles. The lighthouse (situated 27 yards north-westward of the position of the old light), constructed of iron and cylindrical in shape, is painted white, as is also the keeper's dwelling close northward of it. Position approximate, lat. $31^{\circ} 28' 0''$ S., long. $51^{\circ} 28' 30''$ W.

290.—SOUTH AMERICA.—Brazil.—*Port of Bahia*.—(1.) *Fort San Antonio Light and Buoyage of Bank*.—The light exhibited on fort San Antonio, approach to Bahia or San Salvador, is obscured by the land northward of the bearing W. by N. $\frac{1}{2}$ N. And the buoy marking the northern extremity of San Antonio bank, approach to Bahia, is coloured red. The wreck of the steam vessel *Germania* (about 2 cables north-west of point San Antonio) is marked by a small buoy coloured light red.

291.—SOUTH AMERICA.—Brazil.—*Abrolhos Islands*.—*Light Re-exhibited*.—With reference to Notice in 1880 on temporary alteration in the character of Santa Barbara light, Abrolhos island, pending repair of the illuminating apparatus, the revolving light, showing a flash of eleven seconds duration every minute, is re-exhibited. This flash increases to full effect, and then decreases; within the distance of 7 miles a faint continuous light may be seen between the flashes. The light is obscured, as formerly, through a small sector by Redonda islet summit when within the distance of 3 miles from that islet.

292.—SOUTH AMERICA.—French Guiana.—*Cayenne*.—*Enfant Perdu Light*.—The light (fixed white) exhibited on Enfant Perdu, situated 6 miles northward of Cayenne, is now visible round the horizon.

293.—WEST INDIES.—Venezuela.—*Puerto Cabello*.—*Provisional Light Exhibited on Brava Point, and Alteration in Character*.—The revolving light on Brava point, Puerto Cabello, was discontinued for repair of the illuminating apparatus in March; during the repairs a white light would be provisionally exhibited; on the completion

of the repairs, the provisional light would be discontinued, and a *flashing* light exhibited, showing *every forty seconds one flash alternately red and white*.

294.—WEST INDIES.—*New Granada*.—*Magdalena River Bar*.—The bar at the entrance of the Magdalena river is subject to constant changes, arising from the rise and fall of the river being frequent and sudden. Commanders of vessels bound to Baranquilla, are recommended therefore to call either at Santa Marta for a pilot, or at Savanilla for a tug—and are further cautioned, that they should not attempt to enter the river without a pilot.

295.—GULF OF MEXICO.—*Yucatan*.—*Alterations in Progreso Light*.—The illuminating apparatus of the light exhibited at Progreso, is reported to be of the third or fourth order, and the light should be visible from a distance of 12 miles.

296.—UNITED STATES.—*Florida*.—*Cumberland Sound*.—*Re-Exhibition of Amelia Island Principal Light*.—With reference to Notice 160, p. 415, Amelia island principal light, has been repaired, and is now, as formerly, a *flashing white* light, with intervals of *ninety seconds* between the flashes.

297.—UNITED STATES.—*South Carolina*.—*Port Royal Sound*.—*Leading Lights*.—On 1st August, 1881, two sets of leading lights will be exhibited to mark the channel leading into port Royal sound from seaward—the first set to lead through the south-east channel, the second set to lead up the Main channel. The first set will be composed of two *fixed red* lights, established on Hilton head island. The low light is elevated 31 feet above high water, and is visible from a distance of about 11 miles; it is shown from a lantern surmounting a white dwelling. The high light, shown from a lantern on a white frame tower, is elevated 91 feet above high water, and visible from a distance of about 16 miles; it bears W. $\frac{3}{4}$ N. from the low light, distant $1\frac{1}{3}$ th mile. The second set will be composed of two *fixed white* lights, established on Parry (Paris) island. The low light, shown from a lantern surmounting a white frame pyramid of wood, is elevated 45 feet above high water, and visible from a distance of about 12 miles. The high light, shown from a triangular iron frame pyramid 120 feet high, covered in with black slates above for 40 feet, and painted white

below, is elevated 123 feet above high water, and visible from a distance of about 17 miles; it bears N.W. by N. $\frac{1}{2}$ N. from the low light distant one mile. Variation, $2\frac{1}{4}^{\circ}$ E.

298.—NEWFOUNDLAND.—*South Coast.*—*Fortune Bay.*—*Harbour Breton.*—*Destruction of Rocky Point Lighthouse.*—The lighthouse on Rocky point, western side of entrance to harbour Breton, has been destroyed by fire, but it is intended to replace the light as soon as possible, of which due notice will be given.

299.—CANADA.—*Prince Edward Island.*—*Bedeque (Summerside) Harbour.*—*Light on Indian Spit.*—On the opening of navigation in 1881, a light would be exhibited from a lighthouse erected on Indian spit, south side of entrance to Bedeque (Summerside) harbour as a guide to vessels entering; it is a *fixed* white light, showing *red* between the bearings of N.N.E. $\frac{1}{2}$ E. and N.E. $\frac{1}{2}$ E., and *white* in all other directions seaward. It is elevated 48 feet above high water, and should be visible from a distance of 13 miles. The lighthouse consists of an octagonal tower, rising from the middle of an octagonal dwelling on a circular pier, whose foundation is below low water. The superstructure, 42 feet high, is painted white. Position, lat. $46^{\circ} 22' 40''$ N., long. $63^{\circ} 48' 50''$ W. Variation, 23° W.

CANADA.—*Gulf of St. Lawrence.*—*Miramichi Bay.*—*Alterations in Fox Island Leading Lights.*—The leading lights at the north-west end of Fox island, Miramichi bay, have been moved, and a third light established; and the lights as now arranged would be exhibited on the opening of navigation in 1881; they are all *fixed white* lights, shown from lanterns on masts, and should be visible from a distance of 8 miles; at the foot of each mast is a shed painted white. The northern light is situated within 100 feet of the northernmost extreme of Fox island. It is elevated 50 feet above high water (mast 40 feet high). Position, lat. $47^{\circ} 8' 5''$ N., long. $65^{\circ} 2' 20''$ W. The second light, elevated 46 feet above high water (mast 38 feet high), bears S.E. $\frac{1}{2}$ S. from the northern light, distant 350 yards. The third light, elevated 36 feet above high water (mast 28 feet high), bears S.W. from the northern light, distant 318 yards. The first and second lights in line bearing S.E.

S., lead into the old Horse-shoe channel. The first and third lights in line bearing S.W., lead through Portage island channel. The second and third lights in line bearing E. by S., lead to the upper buoy of Horse-shoe shoal. Variation, $23\frac{1}{4}^{\circ}$ W.

301.—CANADA.—*Gulf and River St. Lawrence.*—*Provision Depôts Closed.*—The provision depôts at the south and west points of Anticosti island, and at point de Monts, north shore of river St. Lawrence, are now closed.

302.—CANADA.—*River St. Lawrence.*—(1.) *Bicquette Island Fog-Signal.*—At Bicquette island, south shore of river St. Lawrence, a gun is fired every hour during fog and snow storms.

(2.)—*Green Island Fog-Signal.*—At Green island, south shore of river St. Lawrence, a gun is fired every half hour during fog and snow storms.

303.—CANADA.—*Gulf and River St. Lawrence Lighthouses, Intended Alterations in Colour.*—On or about 1st August, 1881, the following alterations would be made in the colour of the under-mentioned lighthouses in the gulf and river St. Lawrence, so as to make them more conspicuous as day marks, and to distinguish them from one another :—

South Shore.—Cape Rozier, lighthouse to be white; Fame point, white, with one black horizontal band; cape Magdalen, white, with one black vertical stripe; Martin river, white, with two black horizontal bands; cape Chatte, white, with two black vertical stripes; Matane, white, with one black horizontal band and vertical stripe; Little Metis point, white; Father point, white, with one black horizontal band.

Anticosti Island.—Heath point, lighthouse to be white, with one red horizontal band; Bagot bluff, south point, white, with one red vertical stripe; South-west point, white, with two red horizontal bands; West point, white, with two red vertical stripes.

North Shore.—Seven islands, lighthouse to be white, with one red horizontal band; Egg island, white, with one red vertical stripe; point de Monts, white, with two red horizontal bands; port Neuf, white, with two red vertical stripes.

CHARTS, &c., PUBLISHED BY THE HYDROGRAPHIC DEPARTMENT,
ADMIRALTY, IN MAY AND JUNE, 1881.

No.		£.	s.
1510	Pacific ocean :—Sandwich islands (plans, Honolulu and Pearl lochs. Honolulu harbour)	2	6
54	Korea :—Port Lazaref. Shin Po anchorage	1	0
990	Liu Kiu islands :—Napha-kiang roads	1	6
138	Japan, north coast :—Saigo harbour. Ohama harbour	1	6
1602	China, east coast :—Entrance to the Yang-tse-kiang	2	6
1859	England, west coast :—King road	1	6
1080	Tasmania :—Tamar river, with port Dalrymple	1	6
890	South America, east coast :—Formosa to Pernambuco	2	0
2793	England, south coast, Isle of Wight :—Cowes harbour	2	0
1447	Ireland, east coast :—Dublin bar and the river Liffey to Carlisle bridge	2	
264	Cochin China :—Quin Hon or Thi-Nai harbour	1	
2062	China :—Tong-King gulf	2	
155	Italy, west coast :—Gulf of Spezia... ..	1	
898	Andaman isles :—Port Mouat	1	
447	Australia, north coast :—Western approaches to Torres strait	1	
750	Plan added. Quilon road.		
586	Plan added. Ogi bay.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No.	
260	North Polar sea.
2443	Arctic sea :—Melville sound.
21	Magellan strait :—Second narrows to cape Pillar.
23	South America, west coast :—Channels between Magellan strait and gulf of Trinidad.
1015	Australia, south coast :—Guichen bay to Glenelg river.
1182	England, west coast :—Cardiff and Penarth road.
24	South America, west coast :—Channels between gulf of Trinidad and gulf of Penas.

- 0 North Atlantic ocean :—Bermuda islands.
- 9 Pacific ocean, Rapa or Oparo island :—Ahurei bay.
- 8 Red sea :—Red sea, sheet 3.
- 0 Mediterranean :—Saloniki bay.
- 4 South America, north coast :—Approaches to Cayenne.
- 0 Australia, south coast :—Port Adelaide.
- 3a North America, west coast :—Cape Caution to port Simpson, northern portion.
- 4 Australia, south coast :—Cape Jervis to Guichen bay.
- 2 Indian ocean :—Comoro islands, &c.
- 2 Baltic sea :—Gulf of Bothnia.
- 2 North America, east coast :—Labrador.
- 5 North America, west coast :—Cerro island.
- 8 Indian ocean :—Madagascar, northern portion.
- 8 Arctic sea discoveries.
- 4 North Polar chart, Atlantic side.
- 8 North Polar chart, Pacific side.
- 7 Australia, east coast :—Percy isles to Whitsunday island.
- 4 Pacific ocean :—Solomon islands.
- 4 Australia, east coast :—Coral sea, sheet 2.
- 9 China. Yang-tse Kiang.

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE
HYDROGRAPHIC OFFICE, ADMIRALTY, 1881.

- 11.—SOUTH INDIAN OCEAN. Relating principally to Madagascar; Réunion; and the Seychelle islands.
- 12.—CHANNEL PILOT, Part II. Relating to dangers in northern entrance to Little Russel channel, Guernsey.
- 13.—PACIFIC OCEAN. Relating to islands and reefs in the South Pacific.
- 14.—PACIFIC OCEAN. Relating to the Solomon islands and Louisiade archipelago.
- 15.—NEWFOUNDLAND PILOT. Relating to the north-east coast of Labrador, between Rigoulette and Cape Chudleigh; and on Kôksoak river in Ungava bay.
- 16.—BRISTOL CHANNEL DIRECTIONS. Additions and corrections to the sailing directions for the Bristol channel.

- No. 17.—MEDITERRANEAN PILOT, Vol. II. Relating to the west coast of Italy, and to the coast of Syria.
- No. 18.—WEST INDIA PILOT, Vol. II. Relating principally to islands in the West Indies.
- No. 19.—CHINA SEA DIRECTORY, Vol. IV. Relating chiefly to islands and dangers southward of Yedo, gulf of Japan.
- No. 20.—SOUTH AMERICA PILOT, Part II. Relating to Manta bay, Equador.

BOOK.

LIST OF TIME SIGNALS established in various parts of s. d.
the globe 0 6

OUR OFFICIAL LOG.

OFFICIAL INQUIRIES AT HOME.

1039. *Engadine*, s.s.; built at Jarrow, 1880; owned by Mr. J. Wilson and others; tonnage, 802; Nicolaief to Antwerp; grain; lost on the rocks off Ushant, April 27, 1881. Inquiry held at Westminster, before Rothery, Wreck Commissioner; Ronalds and Clarke, N.A. Master guilty of negligent navigation, in running at full speed when uncertain of his position and in thick weather and for neglecting the lead. Certificate suspended for three months.

1040. *Macedonia*, s.s.; built at Waterford, 1864; owned by Mr. Thos. Henderson and others; tonnage, 1,452; New York Glasgow; cattle and passengers; lost near Mull of Cantyre May 29, 1881. Inquiry held at Glasgow, June 17, 1881, before McLaren and Macpherson, Justices; Curling and Murdoch, N.A. Master in default for improper and unseamanlike navigation. Certificate suspended for three months.

1045. *Acorn*, schooner, and *William Hartmann*, s.s.; the former built at Dundee, 1837; owned by Mr. Thomas Stewart; tonnage, 86; Lowestoft to West Hartlepool; ballast; the latter

built at Wallsend, 1880; owned by Mr. A. C. A. Holzappel; tonnage, 802; Rio Marina to Middlesborough; ore; in collision near Staiths, March 28, 1881. Inquiry held at Cardiff, June 25, 1881, before Jones, Judge; Anderson and Rees, N.A. Accident caused from the negligent look-out kept on board the steamer. Chief mate to blame. Certificate suspended for three months.

1048. *Margaret*, schooner, and *Eastham Fairy*, s.s.; the former built at Runcorn, 1841; owned by Mr. S. Ravenscroft and others; tonnage, 63; Belfast to Runcorn; limestone; the latter built at Chester, 1861; owned by Mr. Thompson; tonnage, 79; engaged as a ferry boat; in collision in the Mersey, June 9, 1881. Inquiry held at Liverpool, June 30, 1881, before Raffles, Judge; Aplin and French, N.A. Master of ferry boat to blame. Uncertificated.

1050. *Norman*, s.s.; built at Rotherhithe, 1854; owned by Messrs. Bremer and Bennett and the master; tonnage, 419; Dantzic to Stockton; wheat; lost near Seaham, June 10, 1881. Inquiry held at Westminster, June 29, 1881, before Rothery, Wreck Commissioner; Foster and Kennedy, N.A. Master in default for leaving the deck without giving directions as to the course. Certificate suspended for six months; chief officer warned to be more careful.

1052. *Eupatoria*, brig; built at Sunderland, 1854; owned by Mr. T. Marwood; tonnage, 263; the Tyne to Cowes; coals; supposed to have foundered at sea. Inquiry held at Westminster, July 8, 1881, before Rothery, Wreck Commissioner; White and Hight, N.A. No evidence adduced that threw any light upon the cause of loss.

OFFICIAL INQUIRIES ABROAD, 1880-1.

1038. *Ganos*, s.s., and *Pembroke*, s.s.; in collision 20 miles south of Boston light, May 20, 1881. Naval Court held at Boston, May 27, 1881. Collision due to an error of judgment on the part of master of *Pembroke*.

1041. *Mennythorpe*, s.s.; stranded on the rocks near Baldayo, June 5, 1881. Naval Court held at Corunna, June 13, 1881. Master to blame. Certificate suspended for six months.

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FIFTIETH YEAR.

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SEPTEMBER, 1881.

TWO MODERN GREEK HEROES.

ITH the names of the heroes of ancient Greece all educated Englishmen are familiar. Achilles and Ulysses are as household words to those who never heard of the brilliant and far more authentic deeds of men whose existence is undoubted, and who lived and fought for their country during the present century. In the long and bloody struggle which the inhabitants of modern Greece waged with their Turkish masters, to gain the freedom of their fatherland, the naval campaigns were most glorious and most important in result. Yet Western Europe knows but little of them, and attributes to them but a fraction of the real influence which they exerted upon naval art. The awful efficiency of the submarine torpedo as a weapon of destruction was nearly equalled, if it was not altogether surpassed, by that of the terrible Greek fire-ship. More than thirty years before Sinopé, the seamen of Hydra and Psarra had shown that there was no safety in war for fighting-ships of which the hulls were built of wood. If loss of life and destruction of material form a proper test of the devastating efficiency of any particular system of tactics, the manœuvres which resulted in such severe injury to the Turkish fleet at Erissos and at Chios appear but little, if at all,

inferior to those which the Confederate torpedoists executed against their Federal antagonists in America.

The people who threw off the yoke of the Sultans of Turkey and struggled on until they were aided by foreign nations in making Greece an independent state, were composed of two distinct races,—the Albanians and the pure Greeks, or Hellenes. Amongst the islands of the Archipelago which supplied so many gallant sailors to the cause of freedom, Hydra and Spetzas, both near the entrance to the Argolic Gulf, were inhabited by members of the former race. Hydra, a long ridge of rocks with but little soil fit for cultivation, had at the outbreak of the Greek Revolution in 1821, a population of nearly twenty thousand. These dwelt in the town, the white houses of which rose one above another in irregular rows on the steep sides of a small creek that indented the coast of the island nearest to the mainland. A century before the struggle began the Turkish Sultans, who had granted extraordinary privileges to the subjects of foreign powers trading with their dominions, perceived that the commerce of their own people was greatly suffering in consequence, and with a view of reviving it took under their special protection the enterprising traders and shipowners of the islands. Colonies of Albanians settled at Hydra and at the neighbouring, but small island of Spetzas.

These communities and the Greek inhabitants of Psarra and Kasos, two other islands of the Archipelago, flourished under the protection thus afforded them, and, taking advantage of their position as neutrals during the long wars of the French Revolution, attained to a high condition of prosperity. A considerable Mercantile Marine flying the Ottoman flag grew up. The ships pushed their voyages farther and farther from home, and instead of being exclusively employed in the coasting and inter-island trade of the Levant, were often to be seen in the Western Mediterranean. In the year 1821 the merchant ships belonging to Greek owners were nearly 350 in number, with crews estimated at not less than 12,000 in all.

Hydra had by far the larger fleet and, in the conflict that took place, as a rule supplied the larger contingent to a naval force

(*A Manual for Cadets of the Merchant Service, and for Yachtsmen*),

By CAPTAIN THOMAS H. WITHERS,
(Late Examiner in Seamanship to the Mercantile Marine Board, London.)

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September, 1881.

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not last long, and his father advanced him a sum suffi

ged on any particular service. The leader (Navarch) or al of the Hydriot squadron was in some measure regarded senior officer or, perhaps, even the Commander-in-Chief of the assemblage of ships. His authority, however, was very limited. ad in general to consult his captains before taking any step, hey in turn had frequently to consult their crews. Disci- in the Greek squadrons scarcely existed. Orders could n be enforced, and crews of particular ships often refused rform the duty assigned to them unless they were paid e hand; on several occasions, indeed, ships sailed away and ned home because the period for which the sailors were ged had expired, or because the crews were anxious to it their families. Difficulties of this kind, added to those ed by very deficient supplies, must be taken into account estimating the achievements of the Greek squadrons. The eles in the way of maintaining discipline should also be mbered, as in some way explaining, though far from ing, the abominable excesses which accompanied many a k victory.

e most distinguished amongst the Hydriot leaders, and ps the noblest figure on the side of Greece throughout the rectionary war, was Andreas Miaoulis. Though up to the nceement of the contest he had not held any higher position that of captain of a moderate-sized trading vessel, it not proceeded far before he discovered the qualities of an lent commander as well as those of a disinterested patriot. as the son of an Albanian merchant settled in the island of a, and went to sea at the tender age of seven in one of ther's vessels commanded by an elder brother. He married , at the age of eighteen, the daughter of a priest at Hydra, h island he thenceforward made his home. About the same he succeeded to the temporary command of his brother's and not long afterwards had saved money enough to buy a vessel of his own. His bargain in this case was a bad one, e vessel was not worth the money he had paid for her and ereby incurred the displeasure of his father. This, however, ot last long, and his father advanced him a sum sufficient

to enable him to make other voyages which proved highly successful. He then began a career as a trading captain, in which he was singularly prosperous.

Good seamanship and keenness in business transactions were not the only qualifications required of a ship captain in the Levant in the latter part of the eighteenth century. The war raging amongst the chief European powers so completely engrossed all their energies that the ordinary police of the seas was neglected, and piracy was to a great extent unchecked. Merchant ships usually went armed, and a successful venture was sometimes due as much to hard fighting as to careful navigation and acquaintance with the requirements of trade. Miaoulis, in a small vessel, was once chased by a piratical brig. He ran his craft ashore. His crew took fright and deserted him, leaving him with only his two younger brothers. To these he gave his money, and desired them to follow the rest of their shipmates. He remained alone in his vessel which was boarded by the pirates, who, after cruelly beating him, sent him on shore to provide a ransom for his property. Too much hurt to be able to walk, he crawled to a neighbouring village where he received assistance, which was magnified by the fears of the pirates to a strength greater than its real amount. They accordingly made off, and Miaoulis recovered his vessel and reached Hydra. He subsequently made several other voyages, some of which were disastrous, but in the end the balance of fortune was on his side and he achieved a comfortable independence—becoming owner as well as commander of a good-sized vessel. In this he engaged, and beat off, a French brig which had attacked him. Once during his career he was taken prisoner, on suspicion apparently of piracy or blockade-running, by Nelson, who—pleased with his frank bearing—released him. Miaoulis was proud of this rencontre and frequently spoke of it in after years.

Several years before the outbreak of the Greek insurrection he had retired from a seafaring life, and was living in easy circumstances at Hydra. The Hydriots having determined to throw in their lot with their insurgent compatriots of the mainland and the Archipelago, the various squadrons were collected and combined for the purpose of harassing the Turkish Navy. Miaoulis at

first led a division, but soon attained the leading position—command it could hardly be called—amongst his townsmen. His division performed its first service in blockading Patras and watching the Ottoman squadron on the coast of Epirus. In the second year of the war he was at the head of the fleet (if that name can be properly applied to the collection of vessels, strong in numbers, that had come together from the different islands) which inflicted such terrible disasters upon the force under the Capitan-Pasha who had been present at the awful punishment of Chios. Though the vessels of the Greek Navy were almost exclusively trading craft, they were by no means contemptible on that account. Sixty years ago the ships of the Mercantile Marine did not differ very considerably in design or construction from those of the fighting navy; such difference as there was between them was especially insignificant when those of small size were concerned; and the bulk of the Greek squadrons was composed of vessels not exceeding 500 tons—brigs and small corvettes. Merchant vessels at that date—particularly in neighbourhoods where piracy was prevalent, as in the Levant—and down to a period within recent memory, were as a rule armed, and carried strong crews generally accustomed to the use of their weapons; whilst gun-drill, in its present sense, was scarcely known aboard men-of-war.

The difficulties of an Admiral situated as was Miaoulis were almost insuperable. He had at times the mortification of seeing his best planned schemes miscarry on account of the obstinate refusal of his men to obey orders. In general he extorted compliance with his directions, rather by the force of example than by any power of punishing the refractory. Once, when it was desirable that his vessel should put to sea, the crew refused to go on board; Miaoulis, who was lame and suffering from a fit of the gout, caused himself to be carried through the streets on his bed and so on board his vessel. This proceeding had the effect of inducing his men to follow him, and the fleet put to sea. Throughout his career as a patriot Admiral it was less by striking deeds of headlong gallantry (such as rendered his colleague, Kanares, illustrious) than by uniform moderation, probity, and skilful management of his ships and men that he won renown.

tend successfully against it any more. The invasion of the Morea by Ibrahim, though impeded, had not been prevented. Still it is greatly to the credit of the Greek seamen, and especially to Miaoulis, that, up to the sixth year of the war, Greek ships had more than held their own in a struggle with formidable antagonists.

Miaoulis was eminent chiefly for the solid virtue which we look for in the character of the prudent and resolute Commander-in-Chief. His companion Kanares, a Greek, from the island of Psarra, exhibited on several occasions a daring heroism which has probably never been equalled in the annals of naval warfare. To him has been conceded the honourable title of "The hero of the Greek Revolution." Much younger than the Hydriot Miaoulis, he did not, during the struggle, rise to very high command, his principle exploits having been performed whilst simply a captain in the Psarriot squadron.

After the sack of Chios, Miaoulis fought an indecisive action with the Turkish fleet, and then returned to Psarra. The Capitan-Pasha anchored with his force between Chios and the mainland to celebrate the feast of Bairam. Two Greek vessels entered the roadstead at dusk, and ran into the midst of the Pasha's fleet. One steered for the flag-ship, an 80-gun ship, the other for a 74, both of which were illuminated, in honour of the festival, with coloured lights at their mastheads and yard-arms. Both the Greeks were fire-ships; one was commanded by Constantine Kanares, the other by a Hydriot. Kanares ran his bowsprit into an open port, and grappled the Turkish 80, as far forward as possible, so that the burning mass might be well to windward. When his crew were all in a boat astern, ready to make off, he lighted the train with his own hand, stepped into the boat himself, and pushed off as the flames were mounting to the deck. The Hydriots fastened their vessel to the other line-of-battle ship, and actually set her on fire, though the flames were extinguished in good time. The two captains and their crews, amounting to only thirty-four men in all, made their way through the hostile fleet and escaped unharmed; they had with them a barrel of gunpowder, with which they had resolved to blow

themselves up rather than surrender. In addition to the Capitan-Pasha and his staff there were on board the flag-ship several captains of other ships, and troops, the whole with the crew amounting to 2,286 persons. In a few minutes the ship was one sheet of fire. She burnt for three-quarters of an hour, and then blew up with a terrific explosion. Of those on board only 180 escaped. The Capitan-Pasha himself was mortally wounded by a falling spar just as he had succeeded in getting into a boat.

The new Capitan-Pasha, some months later, anchored between Tenedos and the Troad, near the Besika Bay, of which so much has been heard in later years. Two line-of-battle ships were to windward of the rest of the fleet. Two fire-ships started from Psarra and on the following evening had reached Tenedos. Of these, Kanares was in command of one; the other was a Hydriot. The latter ran aboard the flag-ship, which, cutting her cables, managed to escape. The ship attacked by Kanares was less fortunate. He had calculated every chance too well. He set his antagonist on fire, and in half-an-hour she blew up, with 1,600 persons on board, of whom not more than four or five were saved. No wonder that after this daring exploit Kanares was received by his usually not too appreciative countrymen with enthusiasm wherever he appeared. By his single arm, as it were, in one campaign, two line-of-battle ships and nearly 3,000 of the enemy had been destroyed.

Two years later, off the coast of Asia Minor, near Cay Trogilium, two fire-ships—one a Hydriot, the other commanded by Kanares—steered towards a large Turkish 54-gun frigate with a crew of 600 men. The Hydriot missed the prey. The frigate, however, did not escape. Kanares grappled her, and so effectually that though her captain tried to run her ashore, she was set on fire and blown up. Her crew jumped overboard, and some of them escaped, but many were made prisoners by Greek boats and the small craft sailing around.

In the campaign of 1825, Kanares, to whom of late no opportunity had occurred of rendering any very striking service to the cause of his country, conceived the audacious plan of annihilating Mehmet Ali's armament in the harbour of Alexandria itself,—the port whence the great expedition, under Ibrahim, for the invasion

of the Peloponnesus, had sailed. With his own and two other fire-ships, under the escort of a corvette and a brig, he approached the place. In broad daylight, at three in the afternoon, he and his companions boldly sailed in under false colours, capturing on the way the captain of the port, who had come out in a boat to speak them. The intrepid Greek then steered for some frigates at anchor beneath the windows of the palace; fortunately for these, a sudden shift of wind rendered it impossible to reach them, and the fire-ship, when the train was ignited, drifted harmlessly to leeward. Kanares, however, escaped amid a shower of shot, and regained the corvette in the offing.

One of the last of his exploits, though less fortunate in result, was as daring as anything that he had attempted throughout his astonishingly bold career. A Greek force of thirty-three armed vessels and seven fire-ships fell in with the whole Turkish fleet, composed of two two-deckers, twenty-seven frigates and corvettes, and seven brigs. The latter endeavoured to cut off some of the Greeks who were separated from the main body; but a fresh breeze springing up, they formed in line of battle, and prepared to engage. Kanares alone obeyed a signal made to the fire-ships to attack. He pushed into the midst of the enemy, receiving the fire of the whole line. He had nearly grappled one of the frigates, when his vessel, which had been twice hit, began to sink. He then lighted the match, and got into his boat. Two Turkish launches had been sent to take him before he could run aboard any of their ships. One of these was blown up by the explosion of the fire-ship; the other, he and his boat's crew engaged. A desperate struggle ensued in which, in addition to losing three of his men, he was wounded in the head and arm. He nevertheless beat off his antagonist and got away. As soon as he was cured of his wounds, he again made his appearance in a new fire-ship, and went in search of the hostile fleet.

There is something strange in the absence of interest in the important campaigns of the Greek revolutionary war, and in the usually very imperfect knowledge of the careers of these two distinguished seamen. The patience, fortitude, wisdom, and honour of Miaoulis have never been surpassed in any commander of ancient

equally unknown by the action of currents. In consequence it is necessary for determining the place of a ship :—

1. *To have recourse to objects situated either under or above the surface of the water, and necessarily independent of the sea ;—*

2. *To find out all that these objects can furnish for the determination of the position of a ship at sea ; that is to say, to choose among the geometrical quantities that the said objects can afford (altitudes, &c.) and among the peculiar properties distinguishing them (shape of objects, quality of the ground, &c.) all that can be made useful for that determination ; and—*

3. *These quantities and peculiar properties being determined, we must do our utmost to derive from them all possible advantages in any case that may occur ; and for this purpose employ the most improved mathematical, astronomical and physical theories, to draw from them complete (and at the same time simple) methods of observations and calculations for determining the place of a ship at sea.*

Let us act according to these principles.

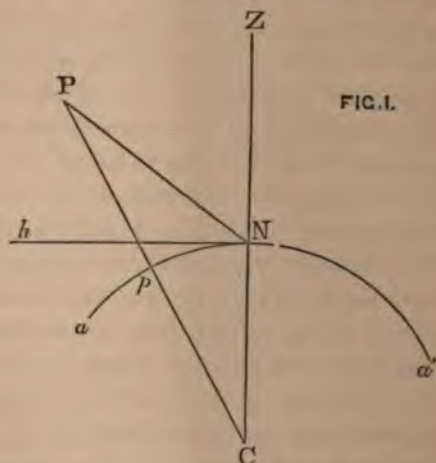
What are the objects under the surface of water ?—At different distances beneath this surface we find the bottom of the sea, which forms plains, valleys and mountains, composed of different kinds of ground. This bottom can be used for navigation in various ways, the whole constituting what may be called *Bottom Navigation* (or sounding by the lead). This method, however, admits of many improvements ; it may even be said that it is far behind the state which it is undoubtedly destined to attain in the future. But *Bottom Navigation* not being the subject of the present paper, it is needless to dwell on it ; we will only say that recently the sounding machine of Sir William Thomson has introduced a capital improvement on the older methods, and that Commander de Magnac is making very interesting experiments on a new instrument intended for the same purpose.

Now, what are the objects situated above the surface of the water and to which we can have recourse for determining the Position of a ship ?—As a matter of course, these objects must be easily recognised and in well-known positions ; on the earth itself we find lighthouses, church steeples, &c. ; beyond the terrestrial sphere we have the heavenly bodies. Thus, besides the

various quantities derived from observations of well-known points in sight, we have also observations made with nautical instruments, such as the sextant and compass, all of which serve as the basis for the determination of the geographical position of an observer, and respecting which we shall call A , the altitude of a point above the horizon of the place; d , the angular distance of two points; and Z , the azimuth of an object.

We must, for finding the use that can be made of the data, obviously begin by the examination of the case in which the number is the smallest; that is to say, see whether the simultaneous observations of a single point can determine the position of the observer: and this is so much the more necessary, since it often happens that a single object is in sight and but for some instants only.

These observations give A and Z . Let Z (Fig. 1) be the zenith, P the observed point, and C the centre of the earth; join



Z and P to C . The plane passing through the lines ZC , PC cutting the earth's surface, determines an arc of the great circle aa' . N is the position of the ship, Nh the intersection of the horizon of the place by the plane ZCP ; join P to N ; we have, the angle $ZNP = PCN + NPC$, now

$$ZNP = \text{the zenith distance} = 90 - A = z;$$

$N P C$ is the parallax of the object, consequently, angle
 $C = z - \text{parallax.}$

The parallax of terrestrial objects is given by tables, and that of heavenly bodies by the *Nautical Almanac*.

Let p be the spot where PC cuts the surface of the earth, the arc Np corresponds to the angle C ; in consequence, the angle C gives the number of minutes of an arc of a great circle of the earth, or of miles of the earth's arc Np , or the *distance in miles from the spot p to the observer.*

The spot p for terrestrial objects is fixed and determined; its position is the known *geographical position* of the observed object, and is given in sailing directions or on charts.

For a heavenly body, the spot p is constantly changing its place in consequence of the earth's rotation and of the motions of the body in declination and right ascension. The point p being defined, for a terrestrial object, as the *geographical position* of this object; by analogy, for a celestial body this point has been also defined as the *geographical position* of such a body.

The determination of the *geographical position* of a heavenly body is very simple, but it necessitates a knowledge of the time at the first meridian at the instant of the observation of the body. This time is given, as we know, by chronometers.

Let T_p be the time at the first meridian at the instant of the observations of the altitude A , and of the azimuth Z , of a celestial body; D the declination and R the right ascension of this body, taken out of the *Nautical Almanac* for the date and the hour T_p of the observation; S_p the sidereal time of the first meridian deduced from T_p ; it is very easily proved that:

Latitude of p , or *Geographical lat.* of the body = D , and

Longitude of p , or *Geographical long.* of the body = $S_p - R = G_a$.

Now it is plain that if from the spot p taken as a pole, with an arc equal to $Np = z - \text{parallax}$, distance of the spot p from the observer, we describe a circle on the terrestrial globe, this circle will contain the position of the observer.

Consequently, the altitude A of any point whatever above the horizon determines on the earth's surface a small circle, on which is the observer; and it does not give anything else, that is to say, neither

a parallel nor a meridian.* This small circle has been named an *altitude circle*.

The fixed character of the point p for terrestrial objects and its motion for celestial objects have naturally led to a capital difference in the employment of these two kinds of objects for the determination of the place of a ship at sea: the utilization of observations of the stationary point constitutes *Coasting Navigation*, and that of observations of the moving object is *Astronomical Navigation*.

Coasting Navigation not being the subject of the present article, we do not purpose dealing with the use of terrestrial points.

Now let us examine the observed azimuth Z ; this angle determines the great circle $a a'$ (Fig. 1) passing through the spot p and the place N of the ship; consequently the position of the ship being once on the *altitude circle* and on the *azimuth circle* is at their intersection of these circles. But, as Z can only be measured on board ship by the compass, and is only read to degrees, it follows that the point determined by the intersection of the *azimuth circle* with the *altitude circle* must give but an erroneous position of the ship.

The simultaneous observations of a single body being insufficient for determining the place of a ship at sea, we must have recourse to observations of two bodies: these give the *angular distance* d of the two bodies and their *two altitudes*. The distance being quite the same, or within a few minutes the same, from different points of the earth, cannot, of course, determine the position of a ship, which, however, may be deduced from two altitudes only. These quantities furnish two circles of the sphere which cut each other in two points; the observer is at one of these two points: and, excepting in cases extremely rare, the position by dead reckoning or a bearing of the observed bodies, is sufficient to show at which

* Theoretically two exceptions exist: if two stars be exactly at the poles of the celestial sphere, the altitudes of these stars would give *altitude circles* confounding with parallels; and if the stars were exactly on the celestial equator, when their altitudes would be 0° , they would determine meridians. Everybody knows that there are no stars in such positions.

of the intersections of the circles is the ship. *In fact the position of the observer at sea is determined by the intersection of two altitude circles, and not otherwise.*

This settled, it is certain that the most speedy and at the same time most simple means of determining the place of a ship, would be to take a terrestrial globe and draw on it the two observed altitude circles; but, as it would be necessary to employ a globe sufficiently large to indicate a mile on its surface, this method is impossible; and this impossibility imposes the obligation of investigating another method of determining the place of a ship.

Mercator's chart replacing the terrestrial sphere on board, it was quite natural to inquire what, on this chart, is the line corresponding to an altitude circle; how is the line to be drawn to obtain the place of the ship, even supposing such a line could be easily projected.

It has been found that the line representing the altitude circle on Mercator's chart is a curve that takes three different forms; two are open curves, and the third resembles an ellipse; they have been named *curves of altitude*. In the last case, and in certain conditions, the curve may be considered as practically blending with a circle, which can be drawn very easily on the chart, as is shown by what follows.

When an observed altitude A is greater than $79^{\circ} 14'$, enter the annexed table with the dead reckoning latitude L_e , and take out the degrees and minutes under A' ; if $A > A'$, the traced circle will pass at less than two miles from the true position of the ship.

For the hour angle T_p of the first meridian at the instant of observation, find the *geographical position* of the observed body:

L_e	A'
0°	$79^{\circ} 14'$
10°	$79^{\circ} 35'$
20°	$80^{\circ} 8'$
30°	$80^{\circ} 52'$
40°	$81^{\circ} 48'$
50°	$82^{\circ} 53'$
60°	$84^{\circ} 10'$
70°	$85^{\circ} 39'$

Geographical latitude = D , and

Geographical longitude = $S_p - R = G_a$

The longitude of the centre of the circle is equal to G_a .

Reckon the zenith distance $z = 90^{\circ} - A$, the sum $D + z =$

L' and the difference $D - z = L''$: on the graduated meridian note the points corresponding to L' and L'' ; determine, with dividers, the point D' , midway between L' and L'' ; the latitude of the centre of the circle is the latitude of D' . Having placed this centre on the chart, take an opening of the dividers equal to $D' L' - 1$; and with this distance describe a circle, which will be the circle of altitude.

This method of tracing the *altitude circle* is the only practical result afforded by the study of *curves of altitude*; but it is precious one, for it permits of the very simple and rapid utilization of great altitudes, in which the old methods of navigation were most generally deficient. This was so much the more to be regretted, since stars very frequently appear near the zenith while it is impossible to perceive others in a better and less elevated position. It might be objected that observations near the zenith offer many difficulties; to that, we will answer that a great part of these difficulties have been removed by the use of the *Navisphere*—a nautical instrument invented by Commander Magnac. The *Navisphere*, adopted last year in the French Navy, gives instantly, and without calculation, the names of all the heavenly bodies which are above the horizon at a given time, with their altitudes and azimuths within a degree. It enables the navigator to select stars for observation, to clamp the index of the sextant to the approximate altitude of the selected star before going on deck, and, when on deck, to turn to the horizon in the direction of the star's azimuth: then he sees the reflected star in the field of the horizon glass, and thus immediately observes the altitude without having identified the heavenly body.

All that could be considered as really practical at sea for the direct determination of the place of a ship by means of Mercator's chart only, not being sufficient, it remained to have recourse to computation for completing the said determination.

Evidently, the first method of proceeding towards solving the problem was to employ the most general mathematical formulæ. In consequence, the equations of the two *altitude circles* on the sphere, with respect to the first meridian and the equator, were defined; they are,—

$$\sin A = \sin L \sin D + \cos L \cos D \cos (G_a - G)$$

$$\sin A' = \sin L \sin D' + \cos L \cos D' \cos (G'_a - G)$$

In these equations, L and G represent the latitude and the longitude of the ship (we know the signification of the other letters); the formulæ are given by the solution of the said equations. These formulæ are very complicated, and quite impracticable at sea; but their determination was not quite useless, for their discussion has demonstrated that the favourable mathematical conditions of the determination of the place of a ship are the following:—
 1. *The difference of the azimuths of the two observed objects must be 90° ; and 2. The altitudes must not be very great.* From the consideration of the errors of altitude results the first condition; and the explanation of the second is very simple. It is plain that if the altitudes are very great, the *altitude circles* must be very small, in which case the two intersections may be very near to each other, and it would be impossible to distinguish which of them was the true position of the ship; and the solution of the problem would then be what is called *indeterminate*.

The general mathematical method having failed to afford a practical computation for the determination of the place of a ship, many other direct methods of solving the problem were tried (among them, the *direct method* or *Delambre's method of double altitudes for determining the latitude*; *Ivory's method of double altitudes*, &c.), but they were all judged to be too long and tedious for ready and effective use at sea.

The failure of all the direct methods in the solution of the investigated problem being duly stated, it became natural to inquire if the indirect method known as the *method of equations of condition* could furnish the desired practical computation; and inasmuch as this method nearly always gives the required results by shorter calculations than the direct methods, the application of it, as we have already said, has led to the *Méthode du point rapproché*, which follows.

(To be continued.)

OUR SEAMARKS.—II.

LIGHT-TOWERS OF THE PRESENT DAY.

IN these days light-towers are vastly different from those of olden times and may be found at short intervals all round our coasts, whereas the blazing beacons of old were separated by great distances. The towers now in use may be divided into three classes, viz., those erected upon the mainland, those set up upon sandbanks, and those built upon rocks out in the sea.

Light-towers on the mainland are usually solid looking structures, designed to withstand the influences of weather; of sufficient height to command a good range to seaward, and also to show as distinctive marks for the use of navigators in the day-time. Formerly the interior of such towers formed the living apartments of the keepers, but the practice of giving the men such "cabin'd, cribb'd and confined" accommodation is not now adopted where other arrangements can be made, and usually the tower lifts its head from the midst of a cluster of neat dwellings or cottages where every provision is made for the comfort of the keepers, their wives and families. The tower is surmounted by the lantern, a large circular chamber glazed all round, to which reference will be made hereafter. A noticeable feature about many of these lighthouses is their wild, isolated and almost inaccessible situation. The necessity of marking some prominent point of land or of indicating dangers to passing ships, often entails the selection of a lighthouse site in a very desolate place, miles from any town or even village, and this naturally adds to the difficulty and cost of their erection, and involves much expense and trouble for the conveyance of oil, coals, &c., when they are established. Indeed so wild and exposed are the situations of some lighthouses on the mainland, that it is a matter of wonder how the materials were conveyed to the localities. At Spurn Point, on the north shore of the Humber entrance, there are two lighthouses and a coastguard station, and the lightkeepers and coastguard men with their wives and families form a little community on the sea-washed

ingly promontory, many miles from the nearest village. Ingeness, on the Kentish coast, another shingly point to which ditions are constantly being made by the action of the sea, is another settlement of lighthouse keepers and coast-guard men, a considerable distance from Lydd the nearest town. Hartland Point, North Devon, has a lighthouse entirely secluded from society. On the Scotch and Irish coasts there are many stations of the character above referred to, where the keepers are unable to send their children to school, or to attend any place of worship. On the other hand some lighthouses are situated very agreeably to those who have the charge of them, the towers being situated either usually in a seaside town or village, or else within comfortable vicinity of some frequented watering place.

Another class of lighthouses are those erected on sandbanks. These are slender-looking structures, the lower part of which is a strong framework consisting of six or eight long iron cylinders coupled so as to form a hexagon or an octagon, and joined to piles driven, or forced in some other manner, to a considerable depth down into the sand, the piles and cylinders being braced together by strong iron ties. Upon a sub-structure of this kind is built the lighthouse, consisting of living rooms for the keepers, surmounted by the lantern, while underneath the tide ebbs and flows, and the waves pass harmlessly through the framework, no resistance being offered to their progress; and the lighthouse stands firmly, though built upon sand. The internal arrangements of such a lighthouse are not very commodious, space is very confined, and the rooms are necessarily few, but nevertheless the keepers are able to make themselves very snug and comfortable. The sands of the coast of Essex formed by the outflow of the River Thames are guarded by four of these pile lighthouses, whereby the navigation of the North Channel leading out of the Thames is much assisted. These lighthouses are known as the Chapman, Mucking, Maplin, and Gunfleet, each name having reference to the shoal which the structure is intended to mark. The Mucking lighthouse stands upon a shoal of sand and mud, and is built upon hollow piles,—that is to say, eight cast iron pipes, each 18 inches in diameter, placed so as to form an

octagon, are worked into the shoal as far as they can be forced, and upon the foundation thus formed the skeleton structure which has to support the living rooms and lantern is erected. The other three lighthouses have foundations upon what are known as screw piles. In these cases the piles are of solid wrought iron, 5 inches in diameter, and attached to the foot of each pile is a wide flat screw having about one turn and a quarter, 4 feet in diameter, and finished off at the bottom with a sort of drill. By means of the screw the piles are worked down more easily into the sand, and the broad flanges (of 4 feet diameter at the foot of each pile) add considerably to the strength of the foundation and the stability of the building. The Maplin screw pile lighthouse has now stood for thirty-seven years, and the other structures referred to for upwards of twenty-seven years. It might seem that such a house built upon sand is not likely to have an existence so enduring as one founded on a rock, but it is to be borne in mind that these iron framework structures are not placed in such exposed positions as the solid granite towers which are intended to withstand the full force of the mighty rollers of the Atlantic, which often come swelling along the ocean's surface charged probably with the momentum of many hundred tons of water.

The lighthouses built on rocks out at sea are structures which excite the wonder of all who see them, about which many books have been written, and which are justly regarded as monuments of the highest engineering skill. Exposed to the fierce rage of tempests, with mighty waves oftentimes weighted with many tons of water dashing and breaking against, sometimes going completely over them, these towers bear witness to a marvellous triumph by man over the forces of nature. Round our coasts there are now many of these wonderful structures which remain steadfast through the most severe storms, while their light shines through the boisterous atmosphere across the angry waters, reaching the anxious sight of the mariner and, in spite of the conflicting elements, giving him comforting assistance at the moment when it is most needed.

The history of the building of lighthouses of this description is

full of interest; the accounts of such works are often records of personal risk, exposure and endurance of the staff employed, of continual battling with opposing natural forces, of long and arduous spells of work in favourable seasons, of successes and disappointments;—of ingenious adaptations to meet exceptional difficulties, and of skilful and clear-sighted engineering ability.

Without entering into technical engineering details, it may be observed that in the construction of these towers the chief elements taken into consideration are (1) form, (2) weight, and (3) rigidity or the method of joining the stone blocks one to the other. As regards form it has been supposed that lighthouse engineers have been in some degree influenced by nature's handiwork as shown in the trunk of a large oak tree, but Mr. Alan Stevenson in his *Treatise on Lighthouses* has effectively shown that there is no real analogy between a lighthouse tower and the trunk of a tree as regards stability. Technically speaking the form generally adopted is that of a number of horizontal conic sections or frusta with varying diameters placed one upon another in such a manner that the vertical outline of the tower forms a curve convex to its axis, commencing at the radius of the base and ending at the radius of the top, the curve being made to approach parallelism with the axis towards the top. In more popular language it may be said that, starting with a large circular base, the tower gradually becomes narrower upwards to about three-quarters of its height, after which it is continued the same size up to the top. In some cases, notably Smeaton's Eddystone tower, the upper part has a gently swelling curve outwards up to a cornice at the top, designed to throw off the waves when running up the tower, and to prevent the water striking the lantern. With this form a low centre of gravity is obtained, and great strength is imparted to the lower part of the tower where the maximum force of the waves is expended. The force of inertia produced by the weight of the material of construction is a most important element in connection with the stability of a rock lighthouse-tower. A sheer weight of over 3,000 tons is not likely to be easily moved, and this weight of stone has been exceeded in many instances. To ensure rigidity and to prevent the loosening

of any of the stone blocks, it is necessary that the structure should be practically monolithic—in other words, like a solid piece of stone carved out of the quarry. With this object the stones are joined to each other by dovetailed joints and by metal bolts at the sides and at the top and bottom, so that no single stone can be moved without disturbing all its neighbours. The lowest course is fixed on to the rock itself in a similar manner, and thus rock and tower are, so to speak, all of a piece.

There are many other considerations in connection with the building of these rock-towers which lighthouse engineers have to take into account, but the points above mentioned may be regarded as the most important. There are questions concerning the means of landing on the rock and access to the tower, the internal space to be provided, the thickness of the walls, the flooring of the several rooms, ventilation of the living rooms and lantern, the storm shutters for the windows, accommodation for storing oil, coals, provisions, &c., and many other details which alter with every lighthouse, and have been modified by the respective engineers to suit different necessities.

The building of these light-towers has been in nearly every case attended with great difficulty and risk. The names of Smeaton, Stevenson, Douglass, and Halpin are all well known in connection with such works; but perhaps few people have an accurate idea of the great personal risk and inconvenience to which the engineers have subjected themselves in order to encourage the men and to urge on the works with the greatest speed at every available opportunity.

The chief rock lighthouses on our coasts are:—

The Eddystone, about fourteen miles S.S.W. from Plymouth. The present tower, which is about to be superseded, was commenced by John Smeaton in 1756, and finished in 1759, and has now stood for 122 years. In consequence of a portion of the rock having been broken away by the action of the sea, it has been deemed advisable to build a new tower on another adjacent rock; this new tower is now nearly completed, and early next year the light will be shown from it. Mr. James N. Douglass, whose experience in such work is very extensive, is the designer and engineer of the new tower.

The Bell Rock, about twelve miles from land, in the estuary of the Tay. The tower on this rock was commenced in 1807, and completed in 1811, under the personal direction of Mr. Robert Stevenson, under difficulties of a very exceptional nature.

The Skerryvore, one of a reef of rocks lying about twelve miles from the most westerly point of the Hebrides. Mr. Alan Stevenson commenced operations on this rock in 1838, and completed the lighthouse in 1844. The tower is of great elevation, and the situation is fearfully exposed.

The Wolf Rock, about nine miles from the Land's End. The tower, commenced in 1862, by Mr. Nicholas Douglass, and completed in 1869 by his son, Mr. James N. Douglass, the present engineer to the Trinity House. The exposed position of this dreaded rock involved the greatest risks in the execution of the work, but courage, perseverance and skill brought it to a successful termination.

The Bishop Rock, off Scilly, about six miles W. from the island of St. Agnes. The noble tower on this exposed rock was built by Mr. Nicholas Douglass, being completed in 1857.

Other rock towers on the English coast are those on the *Smalls Rock*, off St. David's Head, in South Wales; the *Longships Rock*, off the Land's End; the *Needles Rock*, at the western extremity of the Isle of Wight; and the *Hanois Rock*, off Guernsey.

In Scotland there are also the *North Unst* and *Whalsey Skerries*, off the Shetland Islands; the *Dhuheartach*, off Iona; and the *Chickens*, off the Isle of Man.

In Ireland the lighthouse on the *Haulboline Rock*, at the entrance of Carlingford Lough, is a remarkable and beautiful structure, built from the designs of Mr. George Halpin, and first lighted in 1823. Though not so much exposed as many other sea-beaten rocks, the work of building the tower was attended with much difficulty and risk. The *Fastnet Rock*, about four and-a-quarter miles S.W. from Cape Clear, is also marked by a fine tower, built from the designs of Mr. George Halpin. The erection of this building occupied six years, from 1848 to 1854. The rock is of considerable area, affording accommodation for com-

fortable dwellings for the keepers. The tower is of cast iron, lined with brickwork. The tower on the Tuskar Rock, on the East Coast, and that on the Calf Rock, on the West Coast, may also be specially mentioned as noteworthy specimens of rock lighthouses on the Irish coasts.

In the large majority of these rock lighthouses the keepers have to reside in the towers, and accommodation has to be provided for them, as well as for storing their provisions, oil for the light, coals, water, and other necessary stores. In our remarks on the general service of the lighthouses, we shall explain the arrangements in force for the periodical relief of the men, and for supplying the station with stores, &c.

(To be continued.)

BOILER EXPLOSIONS.

F the long list of parliamentary "innocents" who have been sacrificed to the requirements of Irish Land Law, the Boiler Explosions Bill, introduced by Messrs. Mason, Burt, Lee, and Broadhurst, promised to be one of the most useful. The total incompetence of coroners' juries to deal in a satisfactory manner with the investigation of cases of steam boiler explosions has been demonstrated beyond the possibility of doubt. To the ordinary juror there seems to be something mysterious and inexplicable in the fact that a boiler should burst and scatter death and destruction around, without affording some warning of the catastrophe. He appears to be almost prepared to escape the difficulty by classifying such phenomena among the "acts of God" after the manner of coroners' tribunals when dealing with matters which lie beyond the range of their practical knowledge. At the best he can be induced to return a verdict of accidental death accompanied by a recommendation that the Government should make an effort to prevent such disasters in future, either by causing all the steam boilers in the kingdom to be periodical-

inspected, or by compelling the persons who manage them to undergo an examination as to their competence for the duty.

It is hardly necessary to remark in these pages that in ninety-nine out of every hundred cases of fatal boiler explosions there is nothing more accidental than there would be in the deaths that might be caused by firing a gun in the midst of a crowd. If a steam boiler explodes the inference that negligence has been displayed may at once be drawn with almost absolute certainty; and the business of a Court of Inquiry in such a case is to fix the responsibility for the occurrence in the proper quarter. To talk of "accidents" in these matters is sheer nonsense. If the cupidity which induces owners to work boilers long after they should have been broken up as old iron, or to withhold the outlay for keeping them in satisfactory repair and the carelessness of boiler tenders are accidents, then the verdicts of coroners' juries are sound; otherwise, they are simply meaningless.

The Bill to which we now refer provides for the investigation of the circumstances attending boiler explosions by a Court somewhat similar to that of the Wreck Commissioner, or to that before which railway accidents are now inquired into. It may be remarked that no distinction is made between fatal and non-fatal cases. Upon the explosion of any boiler—except such as may be used for domestic purposes, or in the Government service, or on board a certificated passenger steamer—a notice of the fact is to be sent to the Board of Trade; and the Board will then, if they think fit, direct a competent and independent engineer to make a preliminary inquiry. And if it further appears to them that a formal investigation is expedient, they may order an investigation to be held. The Court of Inquiry is to be composed of three commissioners "two of whom shall be competent and practical engineers specially conversant with the manufacture and working of steam boilers," while the third is to be a lawyer. The Court is to be presided over by one of the engineering commissioners, the selection being made by the Board of Trade. It is to possess, for the purpose of its investigations, all the powers of a Court of summary jurisdiction, and its inquiries are to be conducted in

public. The engineer who makes the preliminary inquiry, and the Court which holds the formal investigation, are to make "a full and clear report to the Board of Trade, stating the causes of the explosion, and all the circumstances attending the same, adding thereto any observations thereon, or on the evidence, or on any matters arising out of the investigation which they think right to make;" and the Board are to cause every such report to be made public.

The "Boiler Explosions Bill" appears to us to be based on a sound principle. Instead of making an attempt to provide increased security by throwing the responsibility for the sound condition of steam boilers upon the shoulders of the State, it simply empowers the latter to make inquiry in case of accident and to fix the blame in the quarter to which it legitimately belongs. And it is high time that a measure of this kind should become law. Public opinion is fast giving way to the conviction that something must be done for the prevention of casualties of this kind; and unless steps are taken to check the frequency of their occurrence by the aid of private responsibility, it is quite certain that the State will soon find itself burdened with the charge of all the steam boilers in the country. The tone of the public press, no less than the repeated recommendations of coroners' juries, points strongly in this direction. Even in high quarters there exists a considerable amount of uncertainty with regard to the most efficient method of preventing boiler explosions. For example, the *Times*, in commenting on the disaster which took place at the New Brighton Mills, near Batley, in January last, when sixteen persons lost their lives, remarked that "although the inspection of boilers is no matter which properly falls within the province of Government the Government may without any impropriety be called upon to see that they are inspected." How this system of dealing with the question is to be carried into effect, the writer of the article from which we quote does not condescend to explain; and in fact it is difficult to understand in what way the State can make inspections compulsory, unless it is to become responsible for their efficiency—or, in other words, to carry them out by its own officers. To judge from the evidence given before the coroner in the Batley case, there

would seem to be very meagre grounds for the verdict of "Accidental Death" which the jury returned. The boiler was built in 1855, and during the time it was in the hands of its last owners—about nine years—it does not appear to have been properly inspected or to have undergone any satisfactory repairs. In places the plates, which were originally $\frac{7}{16}$ " thick, had wasted away to the thickness of a sixpence. A great deal of external corrosion had taken place in consequence of the brickwork seating being kept wet by a leakage from a neighbouring reservoir. Indeed this leakage was so great that the bottom flue sometimes became partly filled with water. It may be remarked that this boiler, which originally cost £300, was sold sixteen years later for £40, then again for £75, and finally for £70. Those who had the control of it at Batley must have imagined that its condition was improving with age, since they were not content with the pressure maintained by the safety-valve. "A large piece of stone" was tied to the end of the lever, in order to insure the full development of its powers. We gather these particulars from the report * of Mr. Richards, the Board of Trade surveyor, who attended the inquest on behalf of the Government. The conclusion at which Mr. Richards arrived was that the accident arose simply from the reckless working of a boiler which was completely worn out; and there can be no question that this view is the only tenable one.

It would seem that if it were possible to convince a coroner's jury that boilers do not explode from mysterious and unpreventable causes it would have been done in the Batley case. It is true they were half convinced of the truth in this instance. They expressed the opinion that the explosion arose from over pressure; and then, returning to the old standpoint, they decided that the deaths were accidental. Such a case as this forcibly illustrates the necessity for the formation of some tribunal competent to investigate questions of this kind, and to arrive at something like a practical conclusion as to their merits. The negligence in this instance was so gross and unmistakeable that the authorities could hardly fail to take some action in the matter;

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THE LAW OF DAMAGES CAUSED BY COLLISIONS
AT SEA.

By F. W. RAIKES, M.A., LL.M., OF THE INNER TEMPLE,
BARRISTER-AT-LAW.

(Continued from page 609, August No.)

II. *Collisions where both ships are not to blame.*

WITHOUT going into minute details of varying circumstances the findings as to the cause of collisions may be divided into four classes:—

- (1.) Where blame attaches to one vessel alone.
- (2.) Where blame attaches to both vessels.
- (3.) Where blame attaches to neither, by reason of *force majeure* or inevitable accident.
- (4.) Where the cause of the collision, though obviously not *force majeure* or inevitable accident, is not proved to attach to anyone.

I have thought it convenient to tabulate the effect on the incidence of damages of these different findings under the heads of various countries. (See Appendix B.) That table shows pretty well what a chaos of various laws has supplemented that universal Law of the Sea which Sir Leoline Jenkins and Lord Mansfield praised so highly. Not much would the diversity matter if each State only made laws affecting its own subjects, but a grave and serious difficulty arises in ascertaining what law is to be applied where a collision takes place between ships, one or both of which is foreign to the State in which the cause is to be tried. Mr. Justice Story, who was the first writer who attempted to treat the subject, says: "If the right (of compensation) depends upon the law of the place where the proceedings are had against the ship or the owner, then there will be no reciprocity in the operation of the rule. In a case so confessedly novel in its presentation, it will be found very difficult to affirm any ground of principle upon which the law of one country, rather than that of the other, ought to prevail." (Story Conf. of Laws, 2 Ed., § 423 g.)

In America it has been held that the liability of the owner for damages arising from a collision in British waters was regulated by the *lex loci* of collision (*Smith v. Condry*, 1 How., 28), so far as it is the obvious intention of the Government to make a law which ousts the general Maritime Law of Liability (*The Avon*, Brown's Adm. Rep. 182). But in England this is at all events so far qualified that the Court will not enforce a foreign municipal law which permits a liability which does not exist in this country (*The Halley*, L.R. 2 P.C., p. 204). And generally with regard to collisions on the high seas, the law administered where foreign ships are concerned is the General Maritime Law uninfluenced by the Municipal Law of any country (*The Griefswald*, Swa. 435; *The Saxonia*, Lush 410; *The Zollverein*, Swa. 97; *The Avon*, Brown's Adm. Rep. (Amer.) 182; *The Amalia*, Br. and Lush 151; *The Leon*, W.N. 1881, p. 82).

But the Courts of this country are now bound to give to foreign vessels the benefit, and, also it appears, the burden of the arbitrary limitation of liability (*The Leon*, W.N. 1881, p. 82), enforced by the Merchant Shipping Act 1862, Sec. 54 (the *Amalia* Br. and Lush. 151). The test being that of reciprocity (*Ibid* and *Wendt*, C Mar. Leg., p. 23-40), though to obtain the full benefit it is incumbent on them to comply with the provisions of our Merchant Shipping Acts (the *Franconia*, 4 Asp. Mar. Law Case 1), and the law appears to be similar in the United States (*Joseph W. Dyer v. The National Steamship Company*, 4 Asp. Mar. Law Case 26), and also, from the form of the judgment of the Portuguese Court in the recent case of the *City of Mecca* (W.N. 1881, p. 75), which is against the owners jointly and severally *in solido* they having taken no steps to limit their liability to the value of their ship, it would appear to be in Portugal and probably in other continental countries where similar laws of limitation prevail (Phill. Inter. Law, Vol. IV., Sec. D. CCCXIV). Perhaps the true rule is that cases of collisions on the High Seas belonging to the *Jus Gentium* (Phill. Inter. National Law, Vol. IV., p. 625) the fact of the liability of the owners is to be governed by the General Maritime Law as administered in the particular State where the case is tried, independent of the Municipal Laws of any State, but the measure of that liability being a matter of procedure.

s determined by the law of the forum ; but that in cases of collisions in ports the fact of liability is determined by the law of the port in which the collision happened, if the same facts create a liability in the country in which the case is tried.

Yet the existing differences of law on the subject in various States, may produce anomalous results, *e.g.*, if after a collision in the English Channel one vessel makes a French port and the other an English one, or if such an accident happens in the Scheldt, and one vessel anchors on the Belgian, the other on the Dutch shore, and the facts establish in each case the result that both vessels are to blame, in the first case the French Court will say that by their reading of general Maritime Law, the Code as I have shown being silent on the point, each vessel is to pay in proportion to the blame attaching to her, say that the vessel in that port is to contribute one-third to the joint expenses ; the English Court on the same facts would say that the vessel in an English port must pay one-half only. The liability of the vessel in the French port would be limited only by its value, whereas that in the English port would be arbitrarily limited to £8 per ton. And in the second case the vessel on the Dutch shore would pay nothing of the damage sustained by the vessel on the Belgian shore, whereas the latter would be condemned to pay the former a portion of her loss ; or, again, if the cause of the accident remain a mystery, the vessel in the English port will pay its own and recover nothing, whilst that in the French port will have to pay half the total loss ; and, strangely enough, by the most recently devised Code of an English dependency, Saint Lucia (Appendix A., § 14), a similar result could follow there.

(III.) *The rights and liabilities of cargoes in cases of collision.*

In cases of doubt, under the 3rd clause of Art. 407 of the Code of Commerce, the cargo cannot recover from either ship (D.L. 873-1-842, Note 2) ; and that also is the case in England, as also in Germany, (Art. 787), where to recover it would be necessary to prove that the collision was not a peril of the sea, *i.e.*, to prove negligence in one or other captain, whereas in Portugal (Art. 570), and Holland (Art. 538), in such a case the damage to cargo

is reckoned as general average, and therefore one innocent cargo may in those countries have to pay and the other may recover a portion of the damage done. Where both ships are to blame the cargo in England recovers half its damage from each, in Holland and Portugal all from the ship in which it is laden (Holl. Art. 535, Port. 1568).

(IV.) *The liability of owners where pilots are employed by compulsion of law.*

In England (Mer. Ship. Act, 1854, Sec. 388) and in Germany (Art. 740), the owners are relieved when the fault is that of the pilot. In the United States, where there is any choice as to the particular pilot employed, they remain liable (See *Smith v. Condry*, 1 How. 28; Parsons on Shipping, p. 117, Note; *The China*, 7 Wallace 53, 67, *Law Times*, May 14th, 1881). Whereas in Portugal (Art. 1583), though the liability of the captain and through him of the ship is not removed, yet he has a remedy over against the pilot and the Board who appoints him, a regulation which if adopted in England, by rendering the funds of the Trinity House liable for all collisions alleged to happen by the fault of pilots, would probably reduce that ancient corporation to bankruptcy, or largely reduce the number of collisions alleged to arise from this cause.

(V.) *Liability for Breach of International Regulations.*

In England a breach of the International Regulations which might by possibility have caused or contributed to the collision renders the owners liable (Mer. Ship. Act, 1873, Sec. 17), in the United States (*Hoffman v. Union Ferry Co.*, vii., Amer. Rep. 435), and in Norway (Art. 78) it is only evidence of negligence. In fact, the question in England is, could the breach have contributed to the collision? In other countries, did it do so?

(VI.) *Liability for Acts of Charterer.*

In England where a shipowner has given to another the sole and entire management of his ship, none the less does he remain liable for damages done by her (*Steel v. Lester*, 3 C.P.D. 121) but not so in America (*Somes v. White* xx., Amer. Rep. 718), nor in some of the British possessions (App. A., § 14).

(VII.) *Liability for Loss of Life.*

By English Statute Law (Lord Campbell's Act) a liability is created for damages caused to the estate of one who has lost his life as a consequence of negligence, and a similar liability exists in Scotland, and those foreign countries that have derived their law from the Civil Law. But such liability only exists in certain of the States of the American Union (Sedgwick on Damages, 1880, 533, *et seq.*), and it may therefore be a question whether a claim could be supported for damage to the estate of an American in consequence of the loss of his life in a collision on the high seas when tried in an English Court.

But it would be endless to go through the divergences of the laws of different States even on this single branch of Maritime Law. It suffices it to say in the words of that great master of International Law, the present judge of the Admiralty Court, "when they" (these Codes of Maritime Laws) "incorporate some principle of domestic or municipal policy at variance with that law"—the general Maritime Law—"there is danger of a conflict and collision between the interests of one State and those of the general communities of States, which may lead both to individual injustice, and to a disturbance of the amicable relations of independent nations." (Phill. Inter. Law, Ed. II., Vol. IV., p. 624, Sec. D., CCCXIV.)

To point out these dangers is the peculiar province of the lawyer, to remedy them a work worthy of the legislator, and not vain will this paper have been written should it draw the attention of those who wield the government of the greatest commercial nation the world has ever seen to the subject, and be in the smallest degree instrumental in bringing about an International agreement, which instead of making regulations for the conduct of war in the interest of the peace-breaker, by the abolition of privateering (Congress of Paris), and the prohibition of explosive bullets (Geneva), regulations which would certainly be broken or evaded by a nation in peril of its existence, in obedience to that self-preservation which is the first law of nature, would settle an International Code of Maritime Law in the interest of the great peace-maker, commerce, and bring about again the condition of things spoken of by Sir Leoline Jenkins,

when in extolling the Admiralty Law as administered in his time and by himself, he says, "It is not without special ease and satisfaction to a foreign plaintiff that he shall have the benefit of the same marine laws here, by which we are judged in his country," and that golden age of which Lord Mansfield, applying to this subject the language of Cicero, when speaking of the eternal laws of justice says—

Nec erit alia lex Romæ, alia Athenis; alia nunc, alia posthæc et omnes gentes, et omni tempore una lex et sempiterna immortalis continebit (Frag. de Repub., Lit. 3).

APPENDIX A.

EXTRACTS FROM THE CODES OF MARITIME LAW RESPECTING COLLISIONS AT SEA AT PRESENT IN FORCE IN VARIOUS STATES

Translation of the French and Italian Codes of Commerce.

Art. 216. Fr. 311 Ital. Every shipowner is civilly responsible for the acts of the captain, in all that relates to the ship and the voyage.

This responsibility terminates by the surrender of the ship and freight.

Art. (407 Fr.) (516 It.). In cases of collision.

If the event is the result of accident, the damage is borne by the ship which has sustained it.

If the collision has been caused by the default of one of the captains, the damage is made good by him who did it.

If there is a doubt as to the cause of the collision, the damage is made good at the joint expense of both the ship which has done the damage and that which has sustained it in equal shares.

In these two last cases the amount of damage is assessed by experts.

Holland.

English Translation Edited by the Department of Foreign Affairs at the Hague, 1880.

Art. 321. The owner of a ship or the part-owner, each in proportion to his share, is responsible for the acts and engagements of the master in whatever is relative to the ship and the venture.

This responsibility ceases by the abandonment of the ship, and of the freight earned and yet to be earned by it for the venture to which the acts and engagements are relative.

* * * * *

Each part-owner is released from his responsibility by a like abandonment of his share.

* * * * *

Art. 534. When a ship, by the fault of the master or crew, runs down, runs foul of, or comes in collision with another, and thus damages her, the whole of the damage occasioned to the ship and the goods on board must be compensated by the master of the ship by which the damage has been occasioned.

Art. 535. If it has been caused by fault on both sides, each of them bears his own damage.

In this latter case, as well as in that alluded to in the preceding article, the masters are bound to indemnify the owners of the ships and goods, without prejudice to their regress on the officers and crew if grounds for it appear.

Art. 536. If the running down, running foul, or collision has been purely accidental, each ship and cargo supports her and its own damage, without prejudice to what is stipulated in the 540th Article.

Art. 537. The stipulation of the preceding article also applies if one of the ships is without cargo.

Art. 538. If neither fault nor fortuitousness can be proved, and the cause of the collision therefore is dubious, the damage sustained by both ships and their cargoes shall be added together, and the aggregate be supported by each of them in proportion to the respective value of the ships and cargoes. The amount of such part of the general loss as each ship and cargo has to support, is assessed on each particular ship and cargo, in proportion to their value.

Art. 539. If, after having been run foul of, or having been in collision with another, a ship is lost in the track or course, which it has been compelled to take, to reach a port of refuge to repair the damage sustained, the presumption exists that the loss has been caused by the running down, collision or fouling.

Art. 540. If a ship while under sail or drifting, runs foul of, comes in collision with, and causes damage to, another ship which is riding at anchor or moored in a proper place, and this happens without any fault of the master and crew, she shall support one-half of the damage she has caused to the ship which was anchored or moored, and her cargo, without the latter ship being chargeable with any part of the damage sustained by the one which was under sail or drifting, or her cargo.

This indemnity is assessed on the ship and cargo as general average. The said claim to one-half of the damage does not exist, if the master of the ship lying at anchor or moored, might without danger to herself, have prevented or lessened the damage, by slipping of cables, or the cutting of fastenings, or has not done that when timely urged thereto, by or on the part of the master of the ship which was under sail or drifting.

Art. 542. If ships lying in a harbour or dock, anchored or moored, and without parting from their anchors or getting adrift, come by a high tide, a rough swell, a storm, or other accident of a superior power, in collision with other ships lying near them, so as to cause damage to the latter, such damage is supported by the injured ship, as if occasioned by a peculiar (individual) disaster.

Translation of the Portuguese Code.

The Dutch Code (see p. 698) is an accurate translation of the Portuguese Code in many of its articles.

Art. 321 Dutch corresponds with Art. 1339 Portuguese.

„ 534	„	„	„	1567	„
„ 535	„	„	„	1568	„
„ 536	„	„	„	1569	„
„ 538	„	„	„	1570	„

Art. 1571. Does not relate to collisions, but to the case of vessel fouling and cutting another ship's cable or moorings.

Art. 1572 (Portuguese). If a ship moored in port, but without any person on board, or which, in the opinion of experts, is improperly moored, comes into collision with and does damage to any other vessel, she will be held liable for the damage done.

Art. 1573. Every ship which anchors in an improper place or moves from the berth assigned her, or does not observe the rules of the port or of custom as to the place and mode of anchoring as decided by experts shall in case of collision be presumed to be to blame, and in default of proofs to the contrary be held liable for the damage done.

Art. 1580. A ship under weigh is responsible in case of collision with a ship which is unable to get out of her way. This inability will be decided by experts, having regard to all the circumstances of the case, and after hearing the explanation of the captain of the colliding ship the responsibility of the captain, if his explanation is satisfactory, will be regulated by the terms of the following articles:—

Art. 540 Dutch corresponds with Art. 1581 Port.

Art. 539 Dutch „ „ Art. 1582 Port.

Art. 1583 (Portuguese). In any case in which, according to the law upon this matter, any responsibility for default, negligence, or error in judgment falls upon a captain or ship, if the vessel is in charge of a pilot at the time of the collision, the captain is entitled to an indemnity for the amount he is condemned to pay from the pilot who was in charge, and failing him from the Administration of Pilots.

German Code.

English Translation by E. Wendt, D.C.L. (Wendt's Maritime Legislation, pp. 198, 270.)

Art. 451. The owner is answerable for any damage occasioned to a third party by any of the crew in the performance of their duties.

Art. 452. The owner is, however, not personally liable for the claim of a third party, but is only answerable to the extent of ship and freight.

(3.) When the claim has arisen through the fault of one of the crew.

Damage by Collision.

Art. 736. When two ships come into collision, and either on one or both sides in consequence of such collision, ship or cargo alone, or ship

and cargo, should be damaged or entirely lost, then in case any of the crew of either ship should have occasioned the accident by any fault of his own, the owner of that ship is answerable according to Articles 451, 452, for the repairs of the damage which may have been done to the other ship or her cargo by the collision.

The owners of the cargo in the two ships are not liable to contribute to the repairs of the damage.

The personal liability of the crew for the consequences of the faults is not altered by this section.

Art. 787. If no fault is attributable to any of the crew of either vessel, or if the collision is occasioned by faults on both sides, then no claim can be established for the damage done to either or both ships.

Art. 738. The two preceding sections are applicable whether both vessels, or either of them, are under sail or drifting with the current, or are at anchor, or fastened to the shore.

Art. 739. When a ship which has been damaged by collision sinks before it can reach a port, it is taken for granted that the sinking of the ship was a consequence of the collision.

Art. 740. When the ship is in charge of a pilot (where pilotage is compulsory) and the crew have performed the duties required of them, the owner of the ship is then not responsible for the damage occasioned by a collision for which the pilot is to blame.

Art. 741. The provisions of this article are also applicable when more than two vessels come into collision.

When in such a case the collision shall have been occasioned by the fault of any of the crew of one of the vessels, then the owner of such vessel is answerable also for damage which may be occasioned in consequence of the second vessel through the collision being driven into collision with a third.

In Denmark it appears from the case of *Emery v. Huntingdon* (XII. Amer. Rep. 725,) that the Code in force is still that of 1681 A.D., which is the last given in speaking of the History of the Rules formerly in force (*ante*, July No., p. 550). The author is informed by the Consul-General of Denmark that there is no other special law in existence.

Translation of the Spanish Code.

Art. 935. These belong to the class of simple or particular average (*inter alia*)—(7.) The damage which a ship or cargo sustains from a collision with another ship, if it be inevitable.

When either of the captains is to blame for the accident he is bound to make good at his own charges all the damage he has caused.

(N.B.—From a note in the 5th Edition of the Code by La Serna and Reus, it appears that a collision is always considered as a pure accident, or inevitable, unless it is proved to have been caused by the fault of one of the captains.)

Norway; Law of 24th March, 1860. (Translation.)

Art. 65. If the master acts against the provision enacted in this section (*i.e.* proper care of the cargo), and if in consequence thereof damages arise to the owners of the cargo, or if in any other respect, such damages are caused by fraud or negligence on his part, he is bound to pay an indemnity. Likewise he is responsible for any damage which the cargo may have suffered in consequence of the improper conduct of the crew. . . .

If the master is unable to pay the indemnity which falls to his charge, the owners of the cargo may enforce it from the owners of the ship, but only to the extent of the value of the ship, unless the owners through their own acts have caused the damage. . . .

Concerning Collision of Ships.

Art. 78. When ships come into collision or in any other way run foul of each other, the party who either purposely or by negligence has caused the accident, is bound to pay the damage done to the two ships and their cargoes, negligence, entailing such responsibility, is, in general, considered to be involved in cases like the following:—1. If, when the ship is in Port, the regulations of the Port respecting the place for dropping anchor and the way of working or mooring the ship are not complied with, or if the injunctions given by the authorities are disregarded. 2. If the ship has not been duly moored, although this was possible. 3. If the ship without any necessity either sails or drops anchor nearer to another ship than is proper. 4. If a ship, when moored or at anchor, does not pay out the cable, although by reason of the con-

ditions of the Port and according to Maritime practice, it ought to give place to a vessel entering. 5. If in Port, due watch or, at sea, such look-out as may be considered proper, is not kept, or if such signals for prevention of collisions are not produced or shown as the King has prescribed or Maritime practice makes incumbent.

6. If the ship, which, according to the rules enacted by the King, for the steering of vessels, ought to keep out of the way, neglects to do so. In determining the responsibility for damages inflicted in these and similar cases, it is necessary to take into consideration if time was left for deliberation or if a decision had to be taken immediately. If a collision takes place between a sailing vessel and a steamer under weigh, the negligence is presumed to have been on the part of the steamer.

Art. 79. For damages for which according to the preceding article, the master and the crew are responsible, there is a lien on the ship, in the same manner as, according to the Provisions of Article 101, for bottomry; if, however, the party who has sustained the loss, intends to make the ship responsible, he must bring the claim before the Court within six months after he knows by whom the accident was occasioned.

Art. 80. If the collision has not been caused intentionally or by negligence on either part, no compensation is given, each ship paying its own damage; if it is occasioned by faults on both sides, the Court will decide, according to the nature of the fault committed by each of the parties and to the other circumstances of the case whether, and to what amount, compensation has to be paid to either of the parties.

Sweden, 23rd February, 1864. (Translation.)

Sec. 49. The master is bound to make compensation for damage occasioned by neglect on his part, in watching over rights and interests of owners, or proprietors of goods. For such injury as may be done to other parties, through the fault or neglect of the master or crew, in the performance of their duties the owners shall be held responsible with ship and freight, and may afterwards claim restoration from him by whom the damage was occasioned.

Sec. 284. Claims for which the owners are answerable only with vessel and freight, shall, under pain of losing the right of claim, be enforced within two years from the vessel's arrival at the Swedish port at which, after completion of the voyage upon which the claim has arisen, final discharge of cargo shall take place.

Of Damage by Collision.

Sec. 171. It is specially enacted, as to the precautions to be observed by the master of a vessel, to avoid coming into collision with other vessels.

Sec. 172. When damage to a vessel arises in consequence of a vessel sailing or driving into another, and the master or any one of the crew is the cause thereof, he shall be bound to make good the damage, and the owners be responsible for it as directed by Sec. 42.

If the collision is caused by faults on both sides, or by accident, each vessel shall be at the charge of her own damage; but in the former case it shall be competent for a Court of Justice to try if either side is more chargeable with the collision than the other, and to adjudge the party most to blame to pay a certain portion of the damage to the other vessel; in which case the owner shall also be responsible as directed by Sec. 42.

Sec. 173. In judging as to the question of blame, when a collision has taken place, the Court of Justice shall take into consideration whether the time permitted of deliberation, or if a resolution had to be suddenly taken.

Sec. 174. The cargo on board of a vessel which has caused damage to another shall in no case participate in the compensation due by such vessel.

Sec. 175. When damage has been occasioned to goods through collision between two vessels, and the master or any one of the crew of either vessel was the cause thereof, the Law, as laid down in the first Clause of Sec. 172, shall apply; if the fault is on both sides, each of the masters shall pay the damage sustained by the cargo on board his own vessel, provided one master is not more blameable than the other, in which case the Law, as laid down in the second Clause of Sec. 172, shall apply.

Egypt, 1875. (Translation.)

Art. 242. In cases of collision between ships, if the collision has been the result of pure accident, the damage will be borne, without any claim against others, by the ship which has sustained it. If it has been occasioned by the fault of one of the captains the damage will be made good by him who has caused it. If it has been brought about by faults of both captains, or if there is a doubt as to the cause which has occasioned it, the damage will be made good at the joint expense of the ships, both that which has done the damage and that which has sustained it, in proportion to ~~their~~ respective values: in these two cases the damage will be assessed by experts.

Civil Code of Lower Canada, 1866.

Art. 2524. When a loss by collision occurs by a fortuitous event without either party being in fault, it falls upon the injured ~~ship~~ without recourse against the other. . . .

Art. 2525. When the collision is caused by the fault of the masters and mariners of one of the ships, the party in fault is liable to the other. . . .

Art. 2526. If the cause of the collision is unknown or it is impossible to determine by whose fault it was caused, the damages are borne in equal proportions by both ships. . . .

Art. 2390. The owners are civilly responsible for the acts of the master in all matters which concern the ship and voyage, and damages caused by his fault or the fault of the crew. ~~for~~

They are responsible in like manner for the acts and faults of any person lawfully substituted for the master. ~~of~~

The whole, nevertheless, subject to the provisions contained in the Merchant Shipping Act, 1854.

These provisions are now, however, superseded, by the Admiralty rule where both are to blame, by "Act of Parliament of Dominions of Canada" (43 Vict., c 29), *An Act to Make Better Provision Respecting the Navigation of Canadian Waters*.

Sec. 8. Provided always, that in any cause or proceeding for damages arising out of a collision between two vessels, or a vessel and a raft, if both vessels or both the vessel and the raft are found

to have been in fault, the rules heretofore in force in the Court of Admiralty in England, and now in "Her Majesty's High Court of Justice," under the "Supreme Court of Judicature Act, 1873," as far as they are at variance with the rules in force in the Courts of Common Law shall prevail, and the damages shall be borne equally by the two vessels, or the vessel and the raft, one-half by each.

Civil Code of Saint Lucia, 1876. Pt. IV.

Sec. 2229. Any person who hires a vessel to have the sole and exclusive control and navigation of it, is held to be the owner from the time of such hiring, with the rights and liabilities of an owner as respects third parties. (Bk. II., Ch. V.)

Sec. 2270. When any damage or loss is caused to anything on board a sea-going ship, without the fault or privity of the owner, he is not answerable in damages to an extent beyond the value of the ship, and the freight due, or to grow due, during the voyage; provided that such value shall not be taken to be less than £15 sterling per registered ton, and that the owner shall be liable for every such loss and damage arising on distinct occasions to the same extent as if no other loss or damage had arisen. (Bk. III., Ch. V.)

Sec. 2271. The freight mentioned in the last preceding article is, for the purposes thereof, deemed to include the value of the carriage of any goods belonging to the owners of the ship, passage money, and the hire due, or to grow due, under any contract; except only such hire, in the case of a ship hired for time, as may not begin to be earned until the expiration of six months after the loss or damage. (Bk. III., Ch. V.)

2358. When a loss by collision occurs by a fortuitous event without either party being in fault, it falls on the injured ship without recourse against the other. . . . (Bk. V., Ch. II.)

2359. When the collision is caused by the fault of the master or mariners of one of the ships, the party in fault is liable to the other. . . . (Bk. V., Ch. II.)

2360. If the cause of the collision be unknown, or it be impossible to determine by whose fault it was caused, or if both ships are in fault, the damages are borne in equal portions by both ships. . . . (Bk. V., Ch. II.)

TABLE SHOWING THE LIABILITIES OF SHIPS, SHIPOWNERS,
CIRCUMSTANCES

COUNTRY.				I. One Ship alone to blame.	II. Both Ships to blame.
England	...	{ Common Law		Pays all.	Each paid its own damage
		{ Admiralty ...		Ditto	Each pays half total damage
United States		Common Law		Ditto	Each pays its own damage Kent's Comm., Vol. III., Ed., p. 230, note. <i>Ar</i> <i>Fire Ins. v. Austen</i> , 25 Rep. 221.
		Admiralty ...		Ditto	Each pays half total damage except in extreme cases Conk. Adm. Pract., 375, 1 <i>M. Dousman</i> , 1 Went., At Rep., 236. <i>The Sunnyside</i> <i>Brown</i> , Adm. Rep., 2 <i>Sturgis v. Clough</i> , 21 Ho 451.
France...	...	...	}	Ditto	Each pays in proportion
Belgium	...	...		Art. 407, Fr. & Bel.	the blame.
Italy	...	...		Art. 516, It.	D.L. 1873-3-57, D.L. 1873. 341. C.C. 1382, Mit. M Reg., 1880, pp. 1459, 14
Holland	...	...	}	Ditto	Each pays its own.
Portugal	...	...		Art. 534, Holl. Art. 1567, Port.	Art. 535, Holl. Art. 1568, P
Germany	...	...	...	Ditto, Art. 736.	Each pays its own. (Art. 7
Denmark	...	...	...	Ditto Code of 1683, Bk. IV., Ch. III., Art. 4.	Each pays its own.
Spain	...	...	...	Ditto, Art. 935.	Each pays its own. (Art. 935, Note.)
Norway	...	...	...	Ditto, Art. 78.	Each pays in proportion the blame. Art. 80.
Sweden	...	...	...	Ditto, Art. 172.	Each pays its own as a r but where the degree fault is unequal the Co may do equity. Art. 172 & 175.
Egypt	...	...	...	Ditto, Art. 242.	Each pays in proportion its value. Art. 242 (3).

R.

OWNERS FOR DAMAGES BY COLLISIONS, UNDER DIFFERENT
S COUNTRIES.

III. or to blame, or Inevitable Accident.	IV. Neither proved to be to blame, Inscrutable Cause.
Each pays its own damage. m. & Bruce, Ad. pr., p. 71. Each pays its own damage. s Comm., Vol. III., 4th Ed., 130.	Each pays its own. <i>The Maid of Auckland</i>, 6 Notes of Cases, 240. Prit. Adm. Dig., p. 132. Each pays its own. Each pays half the total damage. <i>Lucas v. Steamboat Swann</i>, 6 McLean, C.C. 282. <i>The Nautilus</i>, Ware, 2nd Ed. 529.
Each pays its own. 407, Fr. & Bel. Art. 516, It.	Each pays half of the total damage. Art. 407, Fr. & Bel. Art. 516, It.
pays its own (Art. 536, Holl. 1569, Port) except where one l is at anchor and the other under in which case the latter pays half receives nothing. (Art. 540. Holl. 1581, Port.)	Each ship and cargo pays in proportion to its value. Art. 538, Holl. Art. 1570, Port.
Each pays its own (Art. 737). Each pays half to total damage, except e one vessel is at anchor, in which he other recovers nothing. <i>Emery v. Huntingdon</i>, XII. Amer. Rep. 725, which case it appears that the of 1683 is still in force.	Each pays its own. (Art. 737.) Each pays half to total damage. <i>Emery v. Huntingdon</i>, XII. Amer. Rep. 725.
Each pays its own (Art. 935). Each pays its own (Art. 80).	Each pays its own. (Art. 935, Note.) Each pays its own. Art. 80.
Each pays its own (Art. 172).	Each pays its own.
Each pays its own (Art. 242).	Each pays in proportion to its value. Art. 242 (3).

APPENDIX C.

SUGGESTIONS FOR A GENERAL CODE OF MARITIME LAW ON THE
SUBJECT OF COLLISIONS AT SEA.

(1.) The owners of any vessel which is to blame for a collision are bound to make good the damage done to the extent of the value of their ship and freight at the time immediately preceding the collision, or at the rate of £10 per ton (50 dollars or 250 frs.) of the gross registered tonnage of their ship, whichever shall be the greatest, exclusive of personal injuries, which shall be compensated for in full.

(2.) Where both vessels have caused the damage, each must bear its own loss, and also that of the cargo laden on board to the same extent.

(3.) Where the damage is the result of inevitable accident, each vessel and each cargo must bear its own loss.

(4.) Where damage is not proved to be the result of any fault, the defect of proof will prevent the damaged party from recovering anything.

(5.) Where judgment has been obtained in one State for damages by collision, the vessel which has done the damage shall be liable wherever she may be found, to be arrested to satisfy the judgment.

These provisions embody the laws already in force in the majority of States in each case, except the last (5), which is an extension of the General Maritime Law that Courts of Maritime Jurisdiction should carry into effect one another's sentences *in rem*, to cases of actions *in personam*.

THE NEW ASTRONOMER ROYAL.—The Queen has been pleased to appoint Mr. William Henry Christie, M.A., F.R.S., to Astronomer-Royal at Greenwich Observatory, in room of Sir B. Airy, who lately resigned. Mr. Christie has been principal assistant for some time, and his promotion is a well-merited compliment, which men of science will recognise, to his undoubted ability and fitness for the position.

PORT CARAVELLAS, BRAZIL.

HITHERTO the port of Caravellas, in Brazil, has not been much frequented by foreign vessels, the trade having been chiefly inland, or carried on by the coasting craft of the country. The town is situated five miles above the entrance to the river, and on the left bank. The entrance is fronted by extensive sand banks, and owing to the meagre and conflicting accounts of the port, which has recently acquired importance as the seaport of the railway now in course of construction from the interior of Minas Geraes to the Bahia seaboard, some definite and reliable information in respect to it had become necessary, and this has been furnished by Col. W. Milnor Roberts, the Government engineer. His examinations include the various channels through the bar and the present condition and capabilities of the harbour and port. The surveys in detail, with recommendations for such improvements as would be of value to the port, are shortly to be published by the Brazilian Government. The information which we are so far able to give, however, will be of special value to those who may be brought into commercial relations with Caravellas through the railway now under construction. The abstract furnished by Col. Roberts is as follows:—

There is a very large sand-bar opposite the mouth of the Caravellas estuary, extending out four miles from the general coast line. It has four channels through it, but only two, the North-east and the South-east channels, are generally used by ocean vessels. Both of these, and also a channel called "Alagodos," (a branch from the S.E. channel) are kept well marked with stakes by the careful pilot, Sr. Jose Joaquim da Rocha, a very intelligent officer, who is thoroughly familiar with all of them. The channels are of sufficient width, with a tolerably direct general course, and are without sudden deflections although they have some curvature in places. They are four miles long from deep water outside to deep water inside. At high water spring tides, the least depth in the North-east channel is 14 feet, the general depth being 16½ feet. In the South-east channel at high water

at the very lowest tide, at which time the visible sand distinctly outlines the position of the channels.

Barra Caravellas (the mast on the south point) is in lat. $17^{\circ} 44' 36''$ S., long. $39^{\circ} 10' 34''$ W.

Vessels bound for this port must have good charts showing the Abrolhos, and the Parcel des Paredes, an extensive group of rocks and shoals stretching 15 miles north and south, and from 6 to 10 miles wide. The Abrolhos light has been lately improved, for particulars of which see our August No., p. 656.

It is to be remarked that the depths given in this abstract are slightly less than those stated in the usual sailing directions; and the need having arisen, the buoyage or marking of the channels is more carefully looked to than formerly. The town is getting to be busy and populous. The exports are coffee, farina (in large quantities), beans, dried fish, and whale oil.

ALTATA, GULF OF CALIFORNIA.

THE *Annalen der Hydrographie* publishes the following information respecting the Mexican port of Altata, situated in the Gulf of California:—

Directions.—In thick weather do not approach the coast nearer than about forty miles, as the depths decrease rapidly. Aqua Pepa (the western spur of the Culiacan mountains) saddle shaped, as also El Dorado, the eastern and more elevated part of the range, together with Double Peak (the highest mountain of a higher range behind the former), whose summit is formed by two rounded peaks, afford excellent landmarks.

Approaching from both northward and southward Aqua Pepa and Double Peak appear similar in form on bearings from E.N.E. to North.

The best time for standing in is about two hours before high water, so as to pass the bar at high water and reach Altata at slack water or at the first of the ebb. Double Peak in line with El Dorado bearing N.E. leads over the bar, after passing which

keep to the northern side of the channel (which is not marked or buoyed in any way), as there the current is stronger and the depths greater.

Before reaching Cabo de Horno (the northern point of the sand bank which extends in a north-westerly direction from the southern shore) keep more to the southern side in order to avoid, after passing Cabo de Horno, a shoal (marked by a wreck) which extends from the northern shore not far from old Altata.

The coast near Altata is quite flat, consisting of sand dunes more or less covered with brush and in some places 50 feet high. On either side, and forming the mouth, of the river is a long flat sand-spit, of which the northernmost extends farthest to seaward, the sand banks extending two miles farther out being continuations of the spits.

The depth on the northern banks is about 7 feet, that on the southern banks 5 feet, and upon each the surf breaks heavily and continuously even during pleasant weather and with N.W. winds.

Bar.—Between the outer points of the banks is the bar off the Boca Grande, formed of hard sand, and having on it a depth of 12 feet at low water springs.

A new channel, Boca Chica, has recently formed near the southern bank and has been used by large vessels.

Anchorage.—The anchorage for large vessels outside the bar is tolerably good and has 9 fathoms on the following bearings:—Aqua Pepa, N. by E.; El Dorado (Cerro of Culiacan) in line with Double Peak, N.E. (Variation, 10° E.)

Altata bears about N.E. by E. $\frac{1}{2}$ E., about 8 $\frac{1}{2}$ miles from the anchorage.

The anchorage off Altata is to the right of the town, in from 5 to 9 fathoms, and it is well to moor with at least 30 fathoms of chain. Vessels drawing over 20 feet cannot readily go up to Altata. Ships frequently have to wait several days before being able to put to sea, as the land breeze is seldom strong enough to allow standing out against the flood tide, even with a moderate swell on the bar.

Current.—The force of the current during spring tides, both at Altata and at the mouth of the river, is from 4 to 5 knots an hour.

Pilots and Harbour Dues.—There are no regular pilots, but in answer to the pilot signal the masters of coasters belonging to the port will come off. They are familiar with the channels, but not with the handling of large vessels. The pilotage is \$1.75 per foot and \$3 for the boat. For the harbour-master \$4, and for the bill of health \$4 are charged. There are two custom-house officials, one of whom is sent on board while the vessel is taking in cargo. No cargo from a foreign port is allowed to enter.

Exports.—The principal exports are dye-wood, silver, and silver ore, hides, and corn.

EMIGRANT ACCOMMODATION.

A BLUE-BOOK has been published containing reports with regard to the accommodation and treatment of emigrants on board Atlantic steamships. These reports contradict in all essential particulars the complaint made by Miss Charlotte O'Brien. In a minute by the President of the Board of Trade, Mr. Chamberlain says:—"There can be no doubt that the condition of emigrant ships has much improved since the subject first called for the interference of the Legislature. The substitution of steam for sailing ships, the comparative shortness of the voyages, the increased size of the ships, the profitable character of the business, the competition of various lines (not only in cheapness, but in accommodation and comfort), have led to improvements far beyond any which the Legislature could have enforced when the Passenger Acts were passed. Great as is the apparent luxury of the accommodation for first-class passengers on good steamers, it may well be doubted whether in point of health, of comfort, of diet, of decency, and of general well-being there is any such difference between the

accommodation provided for steerage and saloon passengers when on board ship as there is between the lodging and food of the same classes when ashore. To take the different points adverted to in succession. As to the diet of emigrants, there is at present no specific complaint; but it will be observed that the food now given in the best lines exceeds both in quantity and quality the scale of diet required by the Passenger Acts, and is no doubt considerably better than that to which the majority of the emigrants have been accustomed on shore. As regards health, so far as it can be provided for by space and ventilation, the progress made appears no less satisfactory. . . . As to general comfort, it is probably impossible to make the crowd on board ship a pleasant object to a person of delicate susceptibilities, especially when visiting a ship at the commencement of a voyage. But the same might be said of every channel steamer. As regards the character and behaviour of the emigrants, the whole tenour of the evidence is to the effect that the conduct of the passengers is, as a general rule, respectable and decent, and that immorality is checked, not only by the precautions taken to prevent it, but by the feelings of the people themselves. It may be doubted whether in what Miss O'Brien says concerning the berths appropriated to single women she has done full justice to the well-known character and virtue of her countrywomen. Indeed, were it otherwise, the course so strongly urged by Miss O'Brien—viz., that of placing great numbers of women together in one large room—would be a most inefficient precaution. Under these circumstances, it appears to the Board of Trade that there are no such evils in the present state of emigrant ships as to call for urgent and exceptional remedies. If there were, the Board would not be deterred from proposing them, either by the fear of imposing expense on the shipowner, or by the apprehension that the business would be driven to foreign ports and to a foreign flag; for they believe that whatever tends to the health, comfort, morality, satisfaction, and general well-being of the passengers will in the end be to the advantage of the trade." Mr. Chamberlain specifies certain precautionary arrangements which are adopted in many ships, and which the Board of Trade desire to see adopted in all:—"They do not propose at present,"

ys, "to ask Parliament for further powers; but it is their
 ion to call the attention of shipowners to these particulars
 hope that, as they have hitherto made many improvements
 and above those required by the existing law, so they will not
 te to take the further steps which existing circumstances
 r to require."

BOARD OF TRADE NOTICES RESPECTING EXAMINA- TIONS FOR CERTIFICATES.

HE Board of Trade have recently (July, 1881) issued
 the following Instructions to Examiners:—

MASTER'S CERTIFICATE OF COMPETENCY.

Service as second mate, subject to certain condi-
 to be equivalent to service as first mate for the purpose of
 lying for examination for a master's certificate of competency.
 e following are the regulations now in force relating to the
 nt and class of sea service required of a Candidate for an
 ary master's certificate of competency, viz.:—

master must be twenty-one years of age, and have been either
 ars at sea, of which one year must have been as first or
 mate *in a foreign-going ship*, and one year as second or
 mate; or he must have been six and a-half years at sea, of
 two and a-half years must have been as second mate *in a*
n-going ship, during the last twelve months of which service
 st have been in possession of a first mate's certificate.

AUXILIARY SCREW VESSELS REGARDED AS SAILING VESSELS.

e Board of Trade are advised that auxiliary screw whaling
 and other vessels, with auxiliary steam power, which use
 screws only in calms or during light winds, may properly,
 he purposes of the examinations, be regarded as sailing
 ls. The Board have, therefore, decided that service in these
 ls is in future to count as service performed in sailing vessels,
 s not to be accepted in cases where service on board steam-
 is required.

TIDE TABLES FOR SEPTEMBER, 1881.

Also Ports of Reference for the Constants in the next Table.

WEEK DAY.	MONTH DAY.	LONDON BRIDGE.		HULL.		NORTH SHIELDS.		LEITH.		DEVON- PORT.		DOVER.		WESTON- MARE.		LIVER- POOL.		GREEN- OCK.		QUEENS- TOWN.		KINGS- TOWN.		LONDON- DERRY.		BREST.			
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		
Th	1	6 50	1 37	3 13	3 50	0 19	0 54	11 47	—	3 12	2 51	8 0	8 34	1 57	2 42	7 7	7 45	7 86	8 20	1 0	6 54	7 33	4 11	4 44	—	0 7	—	0 7	
Fr	2	6 50	1 37	3 13	3 50	0 19	0 54	11 47	—	3 12	2 51	8 0	8 34	1 57	2 42	7 7	7 45	7 86	8 20	1 0	6 54	7 33	4 11	4 44	—	0 7	—	0 7	
Sa	3	6 50	1 37	3 13	3 50	0 19	0 54	11 47	—	3 12	2 51	8 0	8 34	1 57	2 42	7 7	7 45	7 86	8 20	1 0	6 54	7 33	4 11	4 44	—	0 7	—	0 7	
Su	4	9 31	10 16	1 51	2 33	11 40	—	10 34	11 13	0 38	1 28	6 37	7 21	1 57	2 42	7 7	7 45	7 86	8 20	1 0	6 54	7 33	4 11	4 44	—	0 7	—	0 7	
Mo	5	10 59	11 37	3 13	3 50	0 19	0 54	11 47	—	3 12	2 51	8 0	8 34	1 57	2 42	7 7	7 45	7 86	8 20	1 0	6 54	7 33	4 11	4 44	—	0 7	—	0 7	
Tu	6	—	—	1 21	4 40	1 23	1 48	0 16	0 42	3 27	3 59	9 3	9 30	4 35	4 4	8 34	3 25	4 4	8 34	3 25	4 4	8 34	3 25	4 4	8 34	3 25	4 4	8 34	
We	7	—	—	5 13	5 18	5 37	2 35	1 17	1 31	4 27	4 53	9 56	10 23	5 39	6	10 10	10 10	11 24	11 24	11 24	11 24	11 24	11 24	11 24	11 24	11 24	11 24	11 24	
Th	8	1 28	1 51	6 1	6 26	2 37	3 19	1 54	2 16	5 18	5 42	10 48	11 33	6 00	6 54	10 56	11 19	11 19	11 19	11 19	11 19	11 19	11 19	11 19	11 19	11 19	11 19	11 19	
Fr	9	2 13	2 36	6 42	7 10	3 4	2 38	3 39	6	6 28	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	11 38	
Sa	10	2 56	3 7	7 32	7 62	3 23	4 44	3 19	3 39	6 49	7 18	—	0 21	7 53	8 11	0 3	0 24	0 52	1 13	6 25	—	0 13	8 50	9 18	4 7	4 57	5 7	5 7	
Su	11	3 37	3 59	8 12	8 32	5 5	5 25	3 59	4 15	7 26	7 44	0 43	1 5	8 36	8 54	0 44	1 4	1 33	1 53	6 45	7 5	0 33	0 54	9 37	9 55	5 27	5 46	5 46	
Mo	12	4 18	4 38	8 52	9 12	6 25	6 47	5 21	5 40	8 57	8 50	1 26	1 40	9 12	9 29	1 23	1 42	1 23	1 23	7 34	7 43	1 14	1 35	10 17	10 17	11 23	6 45	7 7	
Tu	13	4 57	5 18	9 39	9 59	7 10	7 30	6 7	6 33	9 13	9 32	2 48	3 27	9 46	10 3	1 2	2 20	2 51	3 10	8 23	8 31	1 56	2 10	10 57	11 11	11 23	6 45	7 7	
We	14	5 36	5 56	10 13	10 37	7 47	7 30	7 30	7 30	9 53	10 13	3 38	3 58	11 5	11 35	3 27	3 50	4 16	4 34	9 29	9 39	3 40	4 1	1 53	—	7 30	7 54	7 54	
Th	15	6 21	6 41	11 11	11 35	8 14	8 37	8 59	9 17	10 49	11 26	4 37	5 1	11 52	11 52	4 37	5 1	5 11	5 32	5 15	5 15	3 55	4 11	1 57	1 48	3 38	8 10	8 10	
Fr	16	7 15	7 47	—	0 14	10 37	11 18	9 56	8 50	—	0 9	4 37	5 1	11 52	11 52	4 37	5 1	5 11	5 32	5 15	5 15	3 55	4 11	1 57	1 48	3 38	8 10	8 10	
Sa	17	8 29	9 7	0 56	1 34	10 37	11 18	9 56	8 50	—	0 9	4 37	5 1	11 52	11 52	4 37	5 1	5 11	5 32	5 15	5 15	3 55	4 11	1 57	1 48	3 38	8 10	8 10	
Su	18	9 16	10 35	3 13	3 50	11 56	—	10 49	11 24	0 51	1 23	6 54	7 39	3 15	2 52	7 29	8 0	7 53	8 31	0 40	1 18	7 16	7 45	4 24	4 54	—	0 19	0 19	
Mo	19	11 11	11 41	4 23	4 45	1 01	1 54	0 58	0 58	2 32	2 46	8 7	8 35	3 31	3 54	8 31	8 57	9 0	9 32	1 53	2 23	8 17	8 44	5 19	5 39	0 52	1 19	1 19	
Tu	20	—	—	1 21	1 43	1 24	1 46	0 18	0 18	3 15	3 44	8 39	9 17	4 31	4 54	9 30	9 57	10 10	1 53	2 30	8 16	8 39	5 58	6 11	1 42	2 7	2 7		
We	21	0 31	0 50	5 23	5 45	2 23	2 51	1 49	1 49	4 29	4 58	9 39	10 17	5 36	5 59	10 50	10 50	11 23	11 23	3 30	4 48	4 49	5 0	5 30	6 38	2 30	2 37	2 37	
Th	22	1 12	1 30	5 38	5 54	2 30	2 56	2 56	2 56	4 44	5 19	10 31	10 31	6 56	7 19	10 27	10 27	11 11	11 11	4 22	5 10	5 10	5 33	7 7	7 23	2 59	3 8	3 8	
Fr	23	1 46	2 1	6 10	6 26	3 19	3 4	3 19	3 4	5 19	5 37	10 43	11 01	7 38	7 51	11 27	11 27	11 45	—	4 38	4 54	5 10	5 45	7 1	7 41	7 66	3 24	3 29	
Sa	24	2 27	2 30	6 42	6 54	3 54	3 50	3 33	3 47	5 51	6 7	11 29	11 40	7 4	7 47	11 29	11 40	0 2	0 18	5 10	5 27	5 11	5 39	8 10	8 24	3 39	3 43	3 43	
Su	25	3 44	3 7	7 14	7 30	4 0	4 29	3 1	3 17	6 23	6 39	11 55	—	7 20	7 52	—	0 3	0 31	0 51	5 41	6 1	11 50	—	8 39	8 54	4 26	4 42	4 42	
Mo	26	3 17	3 34	7 46	8 5	4 28	4 53	3 23	3 30	6 55	7 10	12 04	12 04	8 3	8 34	0 50	0 57	1 8	1 23	6 32	6 33	0 7	0 34	9 9	9 25	4 31	4 38	4 38	
Tu	27	3 50	4 4	8 10	8 37	5 13	5 31	4 4	4 23	7 27	7 44	0 59	1 13	9 13	9 13	0 54	1 1	1 42	1 58	6 28	7 10	1 0	0 42	10 9	10 25	5 31	5 39	5 39	
We	28	4 25	4 48	8 50	9 16	5 21	5 41	4 45	4 5	8 5	8 50	1 51	1 51	10 15	10 15	1 56	1 44	2 12	2 12	6 37	7 18	1 1	0 49	10 19	10 40	6 10	6 13	6 13	
Th	29	5 0	5 13	9 30	9 56	5 53	6 05	5 37	5 52	9 35	9 52	2 12	2 12	10 33	10 33	2 61	2 33	2 53	3 14	6 45	6 39	1 5	1 51	11 11	11 11	6 19	6 25	6 25	
Fr	30	6 45	6 53	10 34	10 57	7 38	7 53	6 58	7 13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

By adding the Tidal Constant of the place, according to its sign (+ add, - subtract) to the time of high water on the given day at the port of reference, you will find the time of high water at the place sought.

PLACE.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
	H. M.			H. M.	
.....	-1 17	Leith	Jersey (St. Helier)	+2 38	Brest
.....	-3 53	Liverpool	Kinsale	-0 18	Queenstown
.....	+2 59	Brest	Lerwick (Shetland) ..	-3 47	Leith
.....	+5 13	Dover	Limerick	+1 15	Queenstown
.....	-0 42	Leith	Lisbon bar	-1 17	Brest
.....	+0 50	Brest	Littlehampton	+0 24	Dover
.....	-2 25	Kingstown	Llanelli bar	-0 38	Weston-s.-Mare
.....	-0 18	Greenock	Lowestoft	-4 1	London
.....	-1 49	Leith	Lynn & Boston Deep ..	-0 29	Hull
.....	-1 14	Queenstown	Margate	-2 18	London
.....	-0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
.....	-0 2	Brest	Millford Haven entr. ..	-0 58	Weston-s.-Mare
.....	+0 8	Dover	Montrose	-0 53	Leith
.....	-0 51	Liverpool	Morlaix	+1 6	Brest
.....	+2 42	Londonderry	Needles point	-1 26	Dover
.....	-1 5	N. Shields	Newcastle	+0 23	N. Shields
.....	-0 8	N. Shields	Newhaven	+0 30	Dover
.....	+2 3	Brest	Newport	+0 16	Weston-s.-Mare
.....	+0 13	Dover	Nienport	+1 6	Dover
.....	+0 22	Devonport	Nore	+1 28	London
.....	+0 19	Weston-s.-Mare	Orfordness	-2 43	London
.....	-2 2	Brest	Oporto	-1 17	Brest
.....	-1 56	Liverpool	Ostende	+1 13	Dover
.....	+0 37	Dover	Padstow	-1 41	Weston-s.-Mare
.....	-0 23	Greenock	Peel, Isle of Man	-0 15	Liverpool
.....	+0 2	Weston-s.-Mare	Pembroke Dock	-0 42	Weston-s.-Mare
.....	-4 23	Liverpool	Penzance	-1 13	Devonport
.....	-0 10	Kingstown	Peterhead	-1 43	Leith
.....	-0 47	London	Piel harbour, Barrow ..	-0 18	Liverpool
.....	+4 2	Brest	Plymouth breakwater ..	-0 6	Devonport
.....	-1 37	Londonderry	Poole	-2 2	Dover
.....	-0 23	N. Shields	Port Carlisle	+0 47	Liverpool
.....	-0 10	Brest	Portland breakwater ..	+1 18	Devonport
.....	-0 27	Dover	Port Patrick	-0 58	Greenock
.....	+4 41	Greenock	Portsmouth	+0 29	Dover
.....	-2 21	Leith	Ramsgate	-2 19	London
.....	+0 33	Devonport	Rotterdam	+4 33	Dover
.....	+0 3	Dover	Santander	-0 17	Brest
.....	+7 19	Brest	Scarborough	+0 48	N. Shields
.....	+0 3	Kingstown	Selsea bill	+0 33	Dover
.....	+0 17	Queenstown	Sheerness	-1 21	London
.....	-0 11	Liverpool	Shoreham	+0 22	Dover
.....	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
.....	-0 16	Kingstown	Southampton	-0 42	Dover
.....	-0 27	Dover	Spurn point	-1 3	Hull
.....	+0 56	Dover	St. Ives	-2 10	Weston-s.-Mare
.....	+0 38	Devonport	St. Malo	+2 18	Brest
.....	-0 46	Devonport	St. Mary (Scilly)	-1 16	Devonport
.....	+6 57	Brest	St. Nazaire	-0 7	Brest
.....	-0 47	Brest	Stornoway	+6 38	Greenock
.....	-1 59	Hull	Stromness (Orkneys) ..	-5 17	Leith
.....	-0 12	Liverpool	Sunderland	-0 1	N. Shields
.....	-0 5	Dover	Swansea bay	-0 53	Weston-s.-Mare
.....	-0 29	Devonport	Tay bar	-0 11	Leith
.....	+1 42	Dover	Tees bar	+0 22	N. Shields
.....	-0 26	Queenstown	Tenby	-1 12	Weston-s.-Mare
.....	-1 27	Brest	Thurso	-5 49	Leith
.....	+0 10	Greenock	Torbay	+0 17	Devonport
.....	+2 51	Weston-s.-Mare	Tralee bay	-0 58	Queenstown
.....	+2 26	Brest	Ushant (Ouessant)	-0 15	Brest
.....	-0 48	London	Valentia harbour	-1 19	Queenstown
.....	-0 53	Hull	Waterford	+0 19	Queenstown
.....	+2 50	Brest	Westport	-0 4	Queenstown
.....	+0 5	N. Shields	Wexford	+2 20	Queenstown
.....	-1 52	London	Whitby	+0 23	N. Shields
.....	+6 4	Brest	Whitehaven	-0 9	Liverpool
.....	+0 21	Dover	Wick	-2 55	Leith
.....	-1 12	Liverpool	Wicklow	-0 41	Kingstown
.....	-0 58	N. Shields	Workington	-0 19	Liverpool
.....	+5 42	Brest	Yarmouth road	-4 43	London
.....	-1 59	Leith	Youghall	+0 13	Queenstown

CORRESPONDENCE.

UNIFORM FOR CERTIFICATED OFFICERS.

To the Editor of the "Nautical Magazine."

DEAR SIR,—Perhaps you will allow me to unburden my mind of a subject which I have often thought about. I will preface my remarks by hoping that you agree with me thus far, that any reform which will improve the status of officers in the Merchant Service is a good one.

The Board of Trade gives each of us a certificate of competency, without which we cannot serve. Would it be out of place to give us with it, a distinguishing uniform? At present, we are, in this matter, at the mercy of each individual shipowner or company; and our "uniform," is nothing but a private livery, and not in *any way uniform*. Some of us are almost in Paul's case, in receipt of "forty stripes save one;" others again have nothing to distinguish them from three or four others in the ship's company. In one large mail service, which I could name, the steward is often taken for the chief officer from the extraneous "showiness" of his livery; and I have known instances of the reverse. It is an old story that servants when ashore pass themselves off as ship's officers; about a year since one very gross case of this kind came under my own notice.

I think such a reform as the one I am advocating would make our distinctive dress more honourable than it *now* is. It should, of course, in no way imitate the Naval pattern, but be simple and easily distinguishable; if thought necessary each company might retain its own button. I also think that in these times a steamer at least should be able to ship a *responsible* third officer and he also should have separate uniform, though not holding a separate certificate.

With these suggestions here is another;—could not a Merchant Service volunteer corps (Naval Brigade) be made very popular, provided the authorities and shipowners would meet each other half-way and easy means of drill at all principal maritime centres were arranged?—I am, Sir, your obedient servant,

"TWENTY YEARS SERVICE."

London, Aug. 8th, 1881.

SET OF THE EQUATORIAL CURRENT.

To the Editor of the "Nautical Magazine."

R. M. Officers' Club, Southampton, July 30th, 1881.

SIR,—I beg to forward the particulars of the following circumstance, which may afford some interest to your numerous subscribers, and which clearly proves the prevailing set of the Equatorial current:

On June 23rd, 1880, whilst serving on board the R.M.S. *Douro*, bound for the Brazils, I threw overboard a bottle, when crossing the Equator in long. $31^{\circ} 5' 15''$ W., containing a notice to the effect that during the preceding twenty-four hours the ship had been under the influence of a strong current setting to the E.S.E.

In April of this year the bottle was picked up on the West Coast of Africa, in lat. $4^{\circ} 43'$ N., and long. $6^{\circ} 35'$ E., and forwarded to me by favour of Captain Hampton of the British barque *Mohican*.

Now, presuming that the bottle was picked up the same day as it was washed ashore, which of course is very improbable, the distance direct by Mercator must have been no less than 2,286 miles in ten months, or an average of about 7.6 miles on a N. 83° E. course per day.

The most probable supposition is that it was drifted to the N.E. by the current which sets in that direction during the S.W. monsoon until it fell in with the Guinea current, which carried it along the coast to the place where it was eventually cast ashore, thereby having actually travelled a much greater distance than the direct course by Mercator.

The captain of the *Mohican* tells me in a letter, which he kindly wrote me on the subject, that it is not at all an uncommon thing for bottles, with messages in them, to be picked up on that coast, but never one thrown so far to the westward as was this.

In less than twelve months, notwithstanding the distance travelled by the bottle, the message was once more in my possession, on board the same ship from which it was thrown.

I may add that this, my first experiment, having been so successful, I intend in future to make it a practice with, I hope, similar results.

I am, Sir, your obedient servant,

R.M.S. *Douro*.

C. J. B.

FOG AND COMPASSES.

To the Editor of the "Nautical Magazine."

DEAR SIR,—Of the fallacies popular among seamen, perhaps not the least remarkable is that which attributes to fog the power of affecting the compasses of ships. As the idea has long since been exploded (though there are, perhaps, some who still adhere to the correctness of the supposition), it is not my object to refute the theory by any argument of mine, but merely to suggest what may possibly have been the origin of it, judging from personal experience in a recent voyage to Boston, United States. The weather had been very foggy, with few intervals of clearing for several days, and when in the vicinity south of Cape Sable, soundings were taken which verified pretty fairly the position by reckoning.

In the afternoon of the same day the sun showed for a few minutes the image sufficiently clear to allow bearings of azimuth being taken, but *blurred by fog*. The result of these observations put the compasses ten degrees, or nearly a point, out of truth, and as on previous voyages I had found the compass considerably affected on the Nova Scotian coast, I judged the observations to be correct, and was on the point of altering my course (from the land the error deduced being easterly), when the fog cleared off from overhead, and other bearings were taken which made the compass free from any such error as the previous observation had given. May not similar cases have misled some mariner in by-gone times, who attributed the supposed error to the action of the fog, whereas in reality it was an *incorrect bearing* caused by the refraction of the sun's image in the fog?

As this may be the means of preventing others from falling into the same error, I take the opportunity of bringing it to your notice. After long intervals of fog (especially on ground where the tides are strong and uncertain) the least glimpse of sun is welcomed, and frequently relied on in preference to dead reckoning for giving a correct position.

I am, dear Sir, yours obediently,

J. H. MALET,

Hull, August 12th, 1881.

Commanding S.S. *Marengo*

HALF-YEARS' SHIPMENTS OF COAL AND COKE.

To the Editor of the "Nautical Magazine."

SIR,—For the information of your readers, I beg to give you an abstract of the Shipments of Coal and Coke at the chief ports of the United Kingdom, for Half-years ending June 30, 1880 and 1881:—

Name of Port.	Half-year, 1880.	Half-year, 1881.	Increase, 1881.	Decrease, 1881.
	TONS.	TONS.	TONS.	TONS.
B	94,449	96,297	1,848	—
... ..	63,953	56,467	—	7,486
Breman	116,536	101,396	—	15,140
... ..	162,713	172,370	9,657	—
... ..	114,217	91,864	—	22,353
Westoness	25,059	24,637	—	422
Wf	2,843,748	3,133,683	289,935	—
Westown	96,249	83,214	—	13,035
Se	30,928	37,695	6,767	—
ow	101,685	122,792	21,107	—
... ..	188,582	164,226	—	24,356
on	50,257	72,238	21,981	—
ock	51,388	70,352	18,964	—
by	135,799	95,257	—	40,541
remouth	44,025	34,136	—	9,889
epools	558,101	512,692	—	45,409
... ..	258,527	241,709	—	16,818
Keithing	2,201	3,503	1,302	—
... ..	57,130	47,847	—	9,283
pool	496,144	496,223	79	—
lly	106,275	86,405	—	19,870
ort	898,511	998,493	99,982	—
Glasgow	4,066	3,599	—	467
vid's	27,040	31,236	4,196	—
m	305,988	227,331	—	78,657
rland	1,632,310	1,633,552	1,242	—
sea	738,473	742,180	3,707	—
Ports	52,828	40,526	—	12,302
... ..	150,829	169,937	19,108	—
Ports	3,800,737	3,753,327	—	47,410
haven	93,020	102,983	9,963	—

I remain, yours truly,

ROBERT THUBRON.

Dock and Port Charges Office,

Newcastle-on-Tyne, July 27th, 1881.

BOOKS RECEIVED.

List of Time Signals, established in various parts of the World.
Prepared from Official Sources to December, 1880, by the
 Hydrographic Department, Admiralty. London: J. D. Potter,
 31, Poultry, and 11, King Street, Tower Hill.

THIS pamphlet has been compiled for the use of seamen, as an aid for ascertaining the errors and rates of chronometers. It includes seventy-two principle stations, and a few additional subordinate ones, distributed over different parts of the world that are most frequented by shipping. The geographical arrangement of the stations is chiefly according to the countries in which they are established, as Great Britain, British Possessions, Netherlands (with West and East Indian Possessions), Germany, Norway, Denmark, Sweden, Russia, France, Portugal, Spain, Italy, Austria, United States of America, and South America. In connection with the special place where the time signal is sent, the information is full and clear, including the latitude and longitude, the kind of signal adopted, the exact situation of the Time Signal, the Greenwich mean time and local mean time at which the signal is made, together with additional and particular details for watching and interpreting the signal so that there be no mistake in comparing its indications with the time of the chronometer; thus enabling the seaman to satisfy himself of the error and rate of his time-keeper, and with little trouble determining a new rate if necessary.

The Navisphere. Projected by Captain Aved de Magnac, of French Navy, and constructed by M. W. Eichens, optician to the Paris Observatory.

THE Navisphere is an instrument of very simple construction which, on being properly set, shows at a glance all the stars that are above the horizon at any given time, also their altitudes and azimuths to one degree of arc for any given locality. It shows also the variation of the compass; determines readily the arc of the great circle between any two places on the globe, and gives

the distance on that course within fifteen miles. The instrument was first devised in connection with the new methods of navigation with which Capitain A. de Magnac's name is associated, and is especially useful in indicating what is the star which may be nearly overhead and yet useful in determining the approximate position of a ship; and also in pointing out the relative azimuths of two stars which are well situated for the same purpose.

Report of the International Meteorological Committee; Meeting at Berne, 1880. Published by authority of the Meteorological Council.

WE record the fact of such a Report being published that those of our readers who are more than usually interested in Meteorology may seek to procure a copy. The subjects discussed have a range so wide that the meteorologist pure and simple taking up the pamphlet would get beyond his depth. To us the report is of the highest interest—being full of the most valuable information. We cannot refrain from noting one thing in particular; what is especially wanted at this time is a good meteorological catalogue. No one person knows probably a fourth part of the works that have been published on meteorology, and subjects relating thereto; yet there is an uncertainty as to whether the publication would pay; some say 150 copies could not be sold; so much the worse; it indicates that much of the cry about the value of science is a sham. Surely scientific men ought to appreciate such a work, and show their appreciation by subscribing.

Logarithms of the Values of all Vulgar Fractions with Numerator and Denominator not exceeding 100, arranged in order of magnitude. By Sir George Biddell Airy, K.C.B., F.R.S., &c. Published by the Institution of Civil Engineers.

AN exceedingly valuable set of tables for those connected with any mechanical or engineering work. Their utility is illustrated by an example at the end of the work. The author's name at once ensures utility, and accuracy in the production.

Newcastle-upon-Tyne. "Improvements in the mode of applying water-ballast tanks for screw steamers."

3372. John Henry Laskey, of Boston, Massachusetts, U.S.A. "Improvements in and relating to ship's sleeping berths." (A communication.)

3418. James Dillon, Dublin, Ireland. "Improvement in indicating the depth of water in, and the nature or character of the ground for preparing sections or diagrams of water courses, rivers, harbours and the like, and in apparatus employed therein."

3424. Alexander Houston, of Bombay, British India. "A new or improved arrangement or combination of gearing and apparatus to increase and differentiate the speed of the driving or propelling shaft in locomotive, marine, and other engines." (A communication.)

3438. John Calvin Thompson, of Brooklyn, in the county of King's, and State of New York, U.S.A. "Improvements in or connected with self-levelling berths and other articles on board ship." (A communication.)

3463. Francis Robert Lucas, London. "An improved form of chain for protecting submarine telegraph cables and for connecting them with floating vessels, also other appliances to facilitate establishing telegraphic communication with lightships."

3488. John Wilkinson, Blackpool, Lancaster. "An improved system of screw propulsion for accelerating the speed of ships, boats and other vessels through water."

3490. Louis Van Bunnan, of Sehairbeck, Belgium. "Improvements in tell-tale apparatus for checking or registering the travel performed by policemen, coastguard men, permanent way inspectors and other men on a regular beat. (A communication.)

3508. John Frederick Cooke Farquahr, Middlesex. "Improvements in the means employed for steadying floating bodies or vessels."

3515. John Walter Gibbs, Liverpool, Lancaster. "Improvements in downcast ventilating cowls, applicable for ships."

PATENTS PUBLISHED.

5363. December 21, 1880. Price 8d. John Ericson, of the City and State of New York, U.S.A. (A communication.)

Improvements in and applicable to guns and vessels for submarine warfare, and in explosive projectiles for such guns. This relates to guns, the muzzles of which are presented through, and fitted water-tight, in the openings below the water-line in the bows of the vessels, and also to guns which may be loaded on board the vessel, and fired below the water-line. One improvement consists of a metal piston, the piston fitted to work gas-tight in the bore of the gun, and applied between the projectile and the charge of powder for the object of causing the whole of the explosion to be effectively employed in propelling the projectile. Another improvement consists in a box containing the charge, and of smaller diameter than the bore of the gun which is attached to the piston. Other improvements relate to the vessel, so as to provide means for working the gun, also to preventing the vessel sinking; in hanging the rudder so that no part is above the water-line. This invention further relates to the explosive projectiles and the means for firing them.

16. January 3, 1881. Price 6d. Thomas Frederick Irwin, Liverpool. "Improvements in screw steamships." The object of this invention is to increase the speed, facilitate steering, or increase the carrying capacity and the strength of the vessel, and for this purpose steamships are made with a single body to the waist, but from the latter to aft the hull is divided at the keel into two gradually separating portions, each terminating in a stern of ordinary form. The centre portion, where the hull divides, gradually rises so that from the stern to the waist there is a gradually contracting channel or way. Each stern is fitted with a screw propeller and rudder.

455. February 3, 1881. Price 6d. Frank Barr, of City, County and State of New York, U.S.A. "Improvements in signal buoys." (Complete specification.) This relates to signal buoys in which the signals are produced automatically by air compressed by the vertically reciprocating motion of the buoy, induced by the surface waves in a tube or cylinder which extends from the bottom of the buoy down to still water, and it consists:—(first) in combination with a buoy of this class of an engine or other motor operated by compressed air; (second) in the combination with the

buoy and its compressed air motor of an electric or other light operated or supplied by the motor ; (third) in the combination in a single buoy of a day-mark, a beacon light, a fog-signal, and an automatically operating compressed air motor.

STORM WARNINGS BY CABLE BETWEEN MAURITIUS AND RÉUNION.—The path of cyclones in the southern hemisphere is known to be always from north-east to south-west, or east-north-east to west-south-west. In view of this fact, Commandant Bridet, formerly harbour master of Saint Denis, in Réunion, has sought the aid of the French Government towards connecting that island with Mauritius by telegraph cable, so that cyclones may be announced from the latter eighteen to twenty-four hours in advance. Mauritius is about 90 to 100 miles east-north-east from Réunion, and the distance being so short, the uncertainty which attaches to such announcements in the case of storms crossing the Atlantic from America would here be eliminated. As illustrating the advantages of his project, M. Bridet states that on January 21, at 6 p.m., it was known at Port Louis Observatory, in Mauritius, that a cyclone, the centre of which passed 50 to 60 miles north of the port, would reach Réunion next day about noon, and that Saint Denis would be right in the path of that centre. At Saint Denis they were anxiously inquiring whether the cyclone would pass north or south and at what distance ; it was thought the cyclone would probably pass on the south ; the ships according remained near the shore, and there they encountered the storm in all its fury. Had Saint Denis received warning from Port Louis the ships might have escaped. A further reason urged by M. Bridet is that Mauritius, the only English colony not connected with England by cable, will probably before long cease to be an exception in this respect, and should the proposed cable between the islands be laid, France would then have a means of prompt communication with her colony.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	PLACE.	SUBJECT.
304	ENGLAND—English Channel—Anvil Point	New light in Sept. or Oct.
305	" East Coast—Humber River—Skitter Sand	Shoal extended and buoy moved.
306	SCOTLAND—East Coast—Peterhead	South Harbour open and light shown.
307	BALTIC ENTRANCE—Sound—Skanör	New harbour and light.
308	BALTIC—Schleswig-Holstein—Kiel Fiord	Buoyage; automatic signal.
309	" Sweden—Utlangan Island	Intended light.
310	" Oland Island—East Coast	False report of shoal.
311	GULF OF BOTHNIA—West Finngrand Bank	Intended light-vessel.
312	" Understen Island	Intended fog-signal.
313	SPAIN—West Coast—Pontevedra Bay	Sunken danger at entrance.
314	MEDITERRANEAN—France—Marseille—Pharo Point	New light.
315	" Gulf of Genoa	New harbour lights.
316	" Tunis—Tabarca Island	New light.
317	" " Benzert Road	New lights.
318	" Adriatic—Trieste—Mula di Muggia	Lights to clear the bank.
319	" " Cattaro Gulf—Fort Mamula	Temporary discontinuance of light
320	INDIA—West Coast—Calicut	Permanent light established.
321	" Bay of Bengal—Pondicherry	New lights on landing stage.
322	" " Chittagong Coast—Kutubdea	Lighthouse altered in colour.
323	SOUTH AUSTRALIA—St. Vincent Gulf—Glenelg	Hulk removed; 2-masted schooner in station.
324	UNITED STATES—Pacific Coast—St. Paul Harbour—Alaska	Reported dangers.
325	" Gulf of Mexico—Mississippi River	Change of light at S. Pass.
326	" " Galveston Harbour	New light at Fort point.
327	" Atlantic Coast—Cape Fear	Shoal discovered.
328	" Rhode Island—Old Gay Rock	New fog-bell.
329	" Massachusetts—Boston Harbour—Narrows	New fog-bell.
330	" " Nix's—Mate	New fog-bell.
331	" " Nantucket Sound—Bass River	Light re-established.
332	CANADA—Bay of Fundy—Quaco	Lighthouse burnt; temporary light
333	" St. Lawrence Gulf—Northumberland Strait—Buctouche River	New leading lights.
334	" " Miramachi Bay—Hay Island	New leading lights.
335	" " Chaleurs—Poquesuedie Island	New light.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

304.—ENGLAND.—*English Channel.*—*New Lighthouse on Anvil Point, nearly Midway between Portland and St. Catherine's.*—At the latter end of September, there will be exhibited from the lighthouse now nearly completed on Anvil Point, a powerful white flashing light. The flash will be shown every ten seconds at an elevation of 149 feet above high water, and will be visible from N. 77° 30' E. round South to N. 85° 30' W., and visible from a distance of 18 miles. Bearings are given as from the lighthouse. Further particulars will be published.

305.—ENGLAND.—*East Coast.*—*Humber River.*—*Extension of Skitter Sand.*—In consequence of the elbow of Skitter Sand having extended to the eastward, Buoy No. 8 (black and white vertical stripes) has been moved about 66 yards E. by N. of its former position, and laid in 24 feet with the following marks and bearings:—Hedon church tower in line with the entrance of Hedon haven, E. by N. $\frac{1}{2}$ N.; Dome of the new goal, N.N.W. $\frac{1}{2}$ W.; Thorngumbald Clough lights open of each other, S.S.E. $\frac{3}{4}$ E. But a later notice (dated July) states that the elbow has extended further to the eastward, and that Buoy No. 8 now lies in 15 feet water.

Caution.—Mariners are warned, that for the present, Skitter and should be approached with caution.

306.—SCOTLAND.—*East Coast.*—*Peterhead.*—*Re-Exhibition of South Harbour Light, and Opening of South Harbour.*—With reference to previous Notice on this subject, the light at the entrance of Peterhead south harbour is now re-exhibited, and Peterhead South harbour is opened for traffic of every kind.

Note.—The works of excavating and deepening the entrance to the harbour are still unfinished, but are so far advanced that a channel about 30 feet wide and 5 feet in depth at low water has been formed, leading into the harbour basin. Mariners must, however, use the utmost caution in approaching it.

307.—BAL TIC ENTRANCE.—*The Sound.*—*Opening of Artificial*

reported existence of a shoal of 13 feet, said to lie about $4\frac{1}{2}$ miles eastward of Waholm point, east coast of Öland Island, an examination of the locality has been made, and it is considered that the reported danger has no existence, the steam-vessel *Atalanta* having struck on Matkrok ground, which is situated north-eastward of Kareholm Hamn, and upon which a black buoy has now been moored at 2 miles E.N.E. of Kareholm beacon.

311.—GULF OF BOTHNIA.—*Intended Stationing of Light-Vessel on West Finngrund Bank.*—In the course of this summer, a light-vessel will be stationed S.W. of West Finngrund bank. From the light-vessel a *fixed red* light will be exhibited.

312.—GULF OF BOTHNIA.—*Intended Establishment of Steam Fog-Signal at Understen Island.*—In the course of this summer a steam fog-signal will be established near the lighthouse on Understen island, South Quarken channel.

313.—SPAIN.—*West Coast.*—*Sunken Danger at Entrance to Pontevedra Bay.*—Report respecting the existence of a sunken rock, lying 8 cables westward of the south extreme of Onza island, at the entrance to Pontevedra bay. This danger (*Pan de Centeno*) on which the steam-vessel *Vizcaya* grounded, is a small black rock having a depth of $2\frac{1}{2}$ fathoms, with from $6\frac{1}{2}$ to 7 fathoms water close round it, increasing gradually to 13 fathoms. From the rock the lighthouse on Salvora island, bears N. 2° W.; cape Udra S. 67° E.; and the lighthouse on Faro island, Cies Islands, S. 8° W. Variation, $20\frac{1}{2}^{\circ}$ W.

314.—MEDITERRANEAN.—*France.*—*Marseille.*—*Light on Pharo Point.*—Exhibited from a tower constructed of masonry, recently erected on the extremity of the rocks projecting from Pharo point, entrance to the old basin, Marseille. It is a *fixed green* light, elevated 40 feet above the sea, and visible from a distance of 8 miles.

315.—MEDITERRANEAN.—*Gulf of Genoa.*—(1.) *Alteration in Harbour Lights at Port San Remo.*—The following lights are exhibited from the moles in the port of San Remo, in place of those hitherto shown:—From an iron standard on the south mole is exhibited a *fixed white* light, elevated 32 feet above the sea, and visible over an arc of 240° seaward, from a distance of 5 miles.

From an iron standard on the north mole is exhibited a *fixed green* light, elevated 32 feet above the sea, and visible over an arc of 240° seaward, from a distance of 5 miles.

(2.) *Alteration in Harbour Lights at Port Maurizio.*—The following lights are exhibited from the moles in port Maurizio, in place of those hitherto shown:—From an iron standard on the extremity of the north mole is exhibited a *fixed white* light, elevated 33 feet above the sea, and visible over an arc of 240° seaward, from a distance of 5 miles. From an iron standard, 26 yards within the outer extremity of the south mole is exhibited a *fixed red* light, elevated 34 feet above the sea, and visible over an arc of 240° seaward, from a distance of 5 miles.

(3.) *Alteration in Harbour Lights at Oneglia.*—The following lights are exhibited from the moles in port Oneglia, in place of those hitherto shown:—From an iron standard on the extremity of the east mole is exhibited a *fixed white* light, elevated 31 feet above the sea, and visible over an arc of 240° seaward, from a distance of 5 miles. From an iron standard on the extremity of the west mole is exhibited a *fixed green* light, elevated 32 feet above the sea, and visible over an arc of 240° seaward, from a distance of 5 miles.

316.—MEDITERRANEAN.—*Tunis.*—*Light at Tabarca Island.*—A light is exhibited from the fort on Tabarca island. It is a *fixed white* light, visible from a distance of 3 or 4 miles.

317.—MEDITERRANEAN.—*Tunis.*—*Lights at Benzert Road.*—The following lights have been established at Benzert road:—A *fixed red* light, elevated 46 feet, and visible seaward between the bearings of S. 32° W. through west to N. 35° W., is exhibited from a position 90 yards within the outer extreme of the pier at Benzert. A *fixed green* light, elevated 23 feet, and visible seaward between the bearings of S. 34° W. through west to N. 33° W., is exhibited from a position 27 yards within the outer extreme of the same pier.

Note.—The green light bearing S. 34° W. leads about a quarter of a mile seaward of Boberah bank. *Variation, 12° Westerly in 1881.*

318.—MEDITERRANEAN.—*Adriatic.*—*Gulf of Trieste.*—*Lights to clear Mula Di Muggia Bank.*—In order to lead vessels clear of

Mula di Muggia bank, situated on the north side of the gulf of Trieste, the following lights have been established:—From a small square tower, constructed of masonry, and situated near the shore on the east entrance point of Port Grado, are exhibited two *fixed white* lights, vertical, visible from seaward over an arc of 53° , between the bearings of N. 32° W. and N. 85° W. From a small square tower, constructed of masonry, and situated on the shore north-eastward of Port Primero and $1\frac{1}{10}$ th miles south-westward of Galometo point, are exhibited two *fixed white* lights, vertical, visible from seaward over an arc of 37° , between the bearings of N. 32° E. and N. 69° E.

Note.—Vessels should not approach Mula di Muggia bank so as to have the lights at Grado in sight at the same time as those near Port Primero.

319.—MEDITERRANEAN.—*Adriatic.*—*Gulf of Cattaro Entrance.*—*Temporary Discontinuance of Fort Mamula Light.*—Pending improvements in the illuminating apparatus, the light will be discontinued for about two months from the 1st July, 1881. Further Notice will be given when this light is re-exhibited.

320.—INDIA.—*West Coast.*—*Calicut.*—*Establishment of the Permanent Light.*—With reference to previous notice respecting the temporary exhibition of a fixed light, and the intended alteration in the light-apparatus at Calicut lighthouse, the new permanent light was to be exhibited on the 16th July. It would be a *fixed white* light, elevated 102 feet above the level of high water, and visible from a distance of 14 miles.

321.—INDIA.—*Bay of Bengal.*—*Harbour Lights at Landing Stage, Pondicherry.*—From a mast at the extremity of the landing stage at Pondicherry, a *fixed red* light is exhibited, elevated 31 feet above the sea, and visible from a distance of 1 or 5 miles. When the surf is heavy and approach to the landing stage prohibited, a *fixed green* light is exhibited from an elevation of 26 feet, and visible from a distance of about 3 miles.

322.—INDIA.—*Bay of Bengal.*—*Chittagong Coast.*—*Kutubdea.*—*Alteration of Colour of Lighthouse.*—In order to render Kutubdea lighthouse more distinguishable by day, it has been painted in the following manner:—The basement and the first

storey, 21 feet in height from the ground, remain the original colour, *i.e.*, of a dull gray; the next two storeys, 30 feet in height, are painted white; the fourth storey is painted red, the fifth white, and the top storey red.

323.—SOUTH AUSTRALIA.—*Gulf of St. Vincent, Glenelg.*—The hulk moored off Glenelg has been replaced by a two-masted schooner.

324.—UNITED STATES.—*Pacific Coast.—Reported Dangers in the Approaches to St. Paul Harbour, Kadiak Island, Alaska.*—(1.) A submerged rock or breaker a quarter of a mile West from the S.W. end of the "Round Lumpy rock" termed the "Twins," on Coast and Geodetic Survey Chart, No. 712. This danger is in one with the N.W. edge of Millers cape, bearing S.W. by W., and with the extreme of Outer Spruce cape bearing S. by E. $\frac{1}{2}$ E. (2.) A rock awash at low water, and marked by kelp; situated half a mile N.E. by E. $\frac{1}{2}$ E. from the N.E. end of the "Twins" above mentioned, and in one with Outer Spruce cape bearing S.S.W. and with the N.W. end of Long or Bare island bearing S.E. $\frac{1}{2}$ E. This is called *St. George rock* from the schooner *St. George*, which struck upon it while beating out of St. Paul harbour in a brisk gale in the spring of 1881, and was totally lost. (3.) The Hutchinson reef, consisting of a rocky patch which at some point must have only 9 or 10 feet water over it at low water, situated N.E. about 1 mile from Outer Spruce cape, and extending from that point about half a mile in a north-easterly direction, and having a width of a quarter of a mile. This reef is in one with the "Twins" bearing E. $\frac{3}{4}$ S. These and other known dangers may be avoided while entering by the North channel, if the navigator will take the precaution to keep the N.E. end of Near island, bearing nothing to southward of S.S.W. $\frac{3}{4}$ W. (4.) A breaker (indicated on some very old Russian charts but omitted on more modern ones) bearing about N.N.E. $2\frac{1}{2}$ miles, from the E. end of Long or Bare island, and in one with the N.W. end of that island, bearing S.W. $\frac{1}{2}$ W. It is not known how much water there is on this rock.

325.—UNITED STATES.—*Louisiana.—Gulf of Mexico.—Change of Light at South Pass, Mississippi River.*—On or about August 25, 1881, a light will be shown from the new structure recently

erected on the west side of South Pass, entrance to the Mississippi river. The apparatus lights the entire horizon, and is arranged to show a *white flash* every 5 seconds; elevation, 108 feet above mean low water, and visible from a distance of 16 miles. The structure is an iron frame-work in the form of a truncated pyramid, enclosing the keeper's dwelling, from which a stairway cylinder leads to the lantern. It is painted red, and placed about 100 feet from the structure where the light is now exhibited. Approximate position, lat. $29^{\circ} 1' N.$, long. $89^{\circ} 10' W.$ On the exhibition of the new light, the one previously exhibited will be discontinued.

326.—UNITED STATES.—*Texas.*—*Gulf of Mexico.*—*New Light off Fort Point, entrance to Galveston Harbour.*—A fixed white light is now shown from the lighthouse recently erected off Fort point, entrance to Galveston harbour. It lights about 210° of the horizon, between the bearings N.E. by E. by the northward to S.S.W., and shows two *red* sectors, one on the Turn buoy, (Black No. 1,) about a mile west of the lightship, the other on the Galveston wharves. It is placed 46 feet above mean low water. The structure is hexagonal in form, and stands on iron piles. The foundation is red; superstructure, white, with green blinds; lantern, black. Approximate position, lat. $29^{\circ} 20' 20'' N.$, long. $94^{\circ} 46' 2'' W.$ On entering Galveston harbour at night the Fort point light will not be seen until abreast of the lightship, when it will appear as a fixed white light, and continue as such until near the Black Turn buoy, No. 1, when it will change to fixed red. After making the turn it will show again as fixed white, and continue as such until near the wharves.

327.—UNITED STATES.—*Atlantic Coast.*—*New Shoal.*—*Frying-Pan Shoals, off Cape Fear, North Carolina.*—A shoal has been recently found near the outer end of Frying-pan shoals. It has only 13 feet water on it, lies nearly east and west, about 1 mile in length, by a quarter of a mile in breadth, with Cape Fear bearing N. by W. $\frac{3}{4}$ W., distant about $13\frac{1}{2}$ miles; the Cape Fear lighthouse bearing N.N.W. distant about 17 miles, and Frying-pan shoal light-vessel bearing S.E. by S., distant about 2 miles from its centre.

328.—UNITED STATES.—*Rhode Island.*—*Fog-Bell at Old Gay Rock, Wickford Harbour, Narragansett Bay.*—A fog-bell, struck by machinery, has been established on the temporary wharf for the construction of the lighthouse at "Old Gay" rock. The bell will be sounded during thick or foggy weather.

329.—UNITED STATES.—*Massachusetts.*—*Boston Harbour.*—*Fog-Bell at the Narrows Light-Station.*—A fog-bell, struck by machinery, at intervals of 20 seconds, will be sounded during thick and foggy weather.

330.—UNITED STATES.—*Massachusetts.*—*Bell Buoy off Nix's Mate, Boston Harbour.*—A first-class buoy, surmounted by a bell, has been placed off Nix's Mate, Boston harbour, instead of the first-class nun buoy as formerly.

331.—UNITED STATES.—*Nantucket Sound.*—*Re-establishment of Bass River Light.*—With reference to Notice in 1880, on the discontinuance of Bass river light, north side of Nantucket sound, Massachusetts, the light has now been re-established. It is a *fixed white* light, elevated 36 feet above high water and 30 feet above the ground; visible from a distance of 12 miles. The light is exhibited from an iron lantern surmounting the keeper's dwelling, a two-storeyed house. Position as given, lat. $41^{\circ} 39' 5''$ N., long. $70^{\circ} 10' 10''$ W.

332.—CANADA.—*Bay of Fundy.*—*Destruction of Quaco Lighthouse.*—This lighthouse having been destroyed by fire, a temporary light is exhibited from a lantern, suspended from a pole 20 feet high on the pitch of the cape at West Head. It is a *fixed white* light, visible from a distance of about 6 miles. Position as given, lat. $45^{\circ} 19' 30''$ N., long. $65^{\circ} 32'$ W.

333.—CANADA.—*Gulf of St. Lawrence.*—*Northumberland Strait.*—*Leading Lights at Entrance to Buctouche River.*—Two leading lights have been established at 3 miles north of Dixon point, south side of entrance to Buctouche river, to guide vessels when entering that river. The eastern of these lights is a *fixed white* light, elevated 36 feet above high water, and visible from a distance of 11 miles, when bearing N.W. by W. The light is exhibited from a square wooden tower, 30 feet high, painted white, and situated at the extreme of the point, close to the previously existing

beacon. The western leading light is situated N.W. by W. from the eastern light distant 1,050 feet, and is *fixed white*, elevated 41 feet above high water, and visible from a distance of 12 miles. The light is exhibited from a square wooden tower 34 feet high and painted white. Position of eastern leading light, as given, lat. $46^{\circ} 27' 40''$ N., long. $64^{\circ} 38' 50''$ W.

334.—CANADA.—*Gulf of St. Lawrence.*—*Miramachi Bay.*—*Leading Lights at Hay Island.*—Two leading lights have been established on Hay island, Miramachi bay, to enable vessels when seeking shelter to avoid the shoal extending from the east extreme of that island. The outer light is *fixed white*, exhibited from a lantern hoisted on a mast 15 feet high; it is elevated 23 feet above high water, and visible from a distance of 10 miles. At the base of the mast there is a small shed painted red. The inner light is also *fixed white*, elevated 30 feet above high water, and visible a distance of 11 miles; it is exhibited from a square wooden tower, painted white and 21 feet high, situated 210 feet from the outer light. Position of outer light as given, lat. $47^{\circ} 14' 10''$ N., long. $65^{\circ} 3' 40''$ W.

335.—CANADA.—*Gulf of St. Lawrence.*—*Bay des Chaleurs.*—*Light on Poquesuedie Island.*—Exhibited from a lighthouse erected on the most north-easterly point of the island. It is a *fixed white* light, elevated 41 feet above high water, and visible from a distance of 11 miles from all points seaward. The tower is square, of wood, 34 feet high, and painted white. Position given, lat. $47^{\circ} 49' 10''$ N., long. $64^{\circ} 44' 40''$ W.

ADDENDUM TO NAUTICAL NOTICES.

FRANCE.—*West Coast.*—*Chaussée de Sein.*—*Light on Ar-men Rock.*—While going to press we hear that the new *fixed white* light, visible 20 miles, may be shown before the 1st of September, and mariners are cautioned accordingly. See March number, p. 243, but full particulars next month.

OUR OFFICIAL LOG.

OFFICIAL INQUIRIES AT HOME.

1055. *Benin*, s.s., and *Duke of Buccleuch*, s.s.; the former built at Glasgow, 1869; owned by the African Steamship Company; tonnage, 969; Havre to Liverpool; African produce the latter built at Barrow, 1874; owned by the Eastern Steamship Company; tonnage, 2,024; London to Colombo; general cargo in collision in the Channel, March 12, 1881, when the *Benin* foundered. Inquiry held at Westminster, July 7, 1881, before Rothery, Wreck Commissioner; Powell, Beasley, and Hyde, N.A. *Duke of Buccleuch* to blame for, being the overtaking ship she did not keep out of the way of the *Benin*. Certificate of second officer, who was in charge at the time, suspended for one year.

1056. *Mary Hough*, s.s., *Castilian*, s.s., and *Africa*, s.s.; the first built at Renfrew, 1876; owned by Mr. S. Hough and others tonnage, 564; Liverpool to London; cargo and passengers; the second built at Belfast, 1862; owned by the Steamship Castilian Company; tonnage, 397; Oporto to Liverpool; fruit and cattle and the third built at Birkenhead, 1872; owned by the African Steamship Company; tonnage, 1,098; Liverpool to West Coast of Africa; general cargo and passengers; in collision in Crosby Channel, Liverpool Bay, May 28, 1881; when the *Mary Hough* foundered and one life was lost. Inquiry held at Westminster June 27, 1881, before Rothery, Wreck Commissioner; Pickers Parfitt, and Harland, N.A. Collision between *Mary Hough* and *Castilian*, attributable to the former vessel having been allowed to get on the port side of the channel instead of being kept starboard of it, and also to the great speed at which both vessels were proceeding in a dense fog. *Africa* in no way to blame her collision with the *Mary Hough* was due to the disabled state of that vessel. Both master of *Mary Hough* and pilot in charge of *Castilian* to blame. Certificates not dealt with.

1057. *Minnie Knopp*, brig; owned by Mr. S. Keith; tonnage 183; Glenarm to Newcastle-on-Tyne; limestone; damaged

through striking on a rock off Canna Island, June 10, and stranded on Iona Island, June 12, 1881. Inquiry held at Belfast, July 15, 1881, before Clifford Lloyd, Judge; Wilson and French, N.A. Master in default for strandings, and serious blame is attached to the owner who was ordered to pay the costs of the inquiry.

1061. *John Geddie*, barque; built at Maitland, Nova Scotia, 1866; owned by Mr. J. A. Ledwood; tonnage, 650; Penarth to Monte Video; coals; destroyed by fire and abandoned at sea, April 15, 1881. Inquiry held at Cardiff, July 20, 1881, before Jones, Judge; Forster and Castle, N.A. No evidence to show how the fire was occasioned. Abandonment justifiable.

1062. *Aeron Vale*, brig; built at New Quay, Cardigan, 1860; owned by Mr. J. Griffiths and others; tonnage, 201; Penarth to the Brazils; steel rails; foundered at sea, June 6, 1881. Inquiry held at Cardiff, July 23, 1881, before Jones, Judge; Forster and Castle, N.A. Casualty due to the vessel being overladen and unseaworthy. Master in default for omitting to see that the vessel was seaworthy before leaving, and also for neglecting to make for a port of refuge when he had the opportunity. Certificate suspended for six months.

1063. *Robert*, schooner; built at Carnarvon, 1843; owned by Mr. J. Roberts; tonnage, 75; Runcorn to Frazerburgh; salt; lost on Llanlliana Point, June 16, 1881. Inquiry held at Liverpool, July 27, 1881, before Mansfield, Judge; Vaux and Parish, N.A. Loss caused by holes having been bored in the vessel's side, for which the owner (father of the master) was responsible. Certificate cancelled and ordered to pay £20 costs.

1065. *Ashburne*, s.s.; built at Sunderland, 1879; owned by Mr. J. S. Barwick; tonnage, 1,613; Montreal to Glasgow; general cargo; stranded at entrance to Mall Bay, June 15, 1881. Inquiry held at Glasgow, July 28, 1881, before Stirling and Matheson, Judges; Harris and Ward, N.A. Chief officer to blame for omitting to call the master as instructed. Censured.

1066. *Britannic*, s.s.; built at Belfast, 1874; owned by the Oceanic Steam Navigation Company; tonnage, 3,152; New York to Liverpool; general cargo and passengers; stranded near Kilmore, July 4, 1881. Inquiry held at Liverpool, July 29, 1881,

before Mansfield, Judge; Methven and Comyn, N.A. Master exonerated from blame.

1070. *Globe*, barque; built at Seacombe, 1867; owned by Mr. C. Myers and others; tonnage, 736; abandoned at sea, May 30, 1881. Inquiry held at Liverpool, August 5, 1881, before Mansfield, Judge; Wilson and French, N.A. Casualty due to the vessel being struck by a heavy sea, cargo shifting, and springing a serious leak. Abandonment justifiable.

1071. *Holmrook*, s.s.; built in 1875; owned by Mr. Swan; tonnage, 253; Caen to Swansea; ballast; stranded off Rose Mullion Head, Falmouth Bay, July 18, 1881. Inquiry held at Swansea, August 8, 1881, before Fowler, Judge; Clarke and Kennedy, N.A. Casualty caused by culpable negligence on the part of the master. Certificate suspended for three months.

OFFICIAL INQUIRIES ABROAD.

1054. *Epervier*; stranded in Chittagong River, January 15, 1881. Inquiry held at Chittagong. Pilot severely reprimanded.

1058. *Joliba*, barque; stranded on Southern Flats, Freemantle. Inquiry held there, May 27, 1881. Pilot to blame.

1059. *Hailoong*, s.s.; stranded on Island of Quemoy, April 2, 1881. Inquiry held at Hong Kong, May 23, 1881. Master in default. Certificate suspended for six months.

1060. *Glenlogan*, s.s.; destroyed by fire, and abandoned at sea, June 3, 1881. Naval Court held at Pernambuco, June 22, 1881; abandonment somewhat precipitate. Fire caused by a naked light having been held to a hole in the propeller tunnel, igniting the cargo, which was of an inflammable nature. The hole was cut by direction of the chief engineer, whose certificate was suspended for six months.

1064. *Leo*, steam tug; and *Bonnie Dundee*, schooner; in collision in Newcastle Harbour. Inquiry held at Newcastle, New South Wales, June 3, 1881. Casualty due to a sudden and dense fog.

1065. *Castile*, s.s.; and *Warremer*, s.s.; in collision in

1067. A River, May 24, 1881. Inquiry held at Sydney, June 6, 1881. Master of *Swan* in default. Cautioned to be more careful.

1068. *Ocean Bride*, schooner; lost at entrance to Richmond River, May 20, 1881. Inquiry held at Sydney, June 13, 1881. Master free from blame.

1069. *Sir Donald*, s.s.; and *Boojum*, s.s.; in collision at Napier, New Zealand. Inquiry held there, May 14, 1881. Casualty due to error of judgment on part of master of *Boojum*.

GENERAL.

ALTERATION OF THE FRENCH TERMS TRIBORD AND BABORD.—It has long been recognised that there is a considerable similarity in the sound of the terms *tribord* (starboard) and *babord* (port), owing to the terminal syllable *bord*, and the usual habit of dwelling on it when giving the order to the man at the wheel. To obviate any misconception in future a change has been proposed, viz., to transpose the syllables in each word; and the French Minister of Marine has issued an order that henceforth the terms shall be *bord-tri* and *bord-bas*; the terminal syllables of which in no way approximate to each other in sound, and the helmsman will catch *tri* and *bas* rather than *bord*.

ARCTIC AND ANTARCTIC METEOROLOGICAL STATIONS.—The Director of the St. Petersburg Central Physical Observatory states that all the Arctic Meteorological stations (as indicated by the International Polar Conference, held at Hamburg, in October, 1879), will very soon be occupied, and that in the autumn of 1882 observations for a whole year from all the stations will be issued. The following are the stations to be established:—On Spitzbergen, by Sweden; in North Finnmark (North Cape), by Norway; at Upernavik (West Greenland), by Denmark; on Novaya Zemlya (where observations have already been made since August, 1878), and at the mouth of the Lena river, by Russia; on Jan Mayen island, and (if possible) on the East coast of Greenland, by Austria-Hungary; and at Point Barrow and in Lady Franklin Bay (North America), by the United States. It is not improbable that the Dutch will also establish a station at Dickson haven in Siberia. The Polar Conference recommended that South Georgia, Kerguelan, Auckland,

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DO STEEL SHIPS PAY?



ILD steel has now been in use in shipbuilding a sufficient time to afford some material for a judgment as to its economical advantages as compared with iron. In a paper read before the Institution of Naval Architects in 1878, Mr. Martell estimated the saving in weight obtained by using steel instead of iron at 18 to 19 per cent., and his calculations as to the consequent gain were based upon that percentage. Lloyd's Registry allow a reduction in scantlings of 20 per cent., but it is obviously impossible to obtain the benefit of this in every case owing to the fact that both iron and steel are only rolled to certain sizes, plates, for instance, only graduating in thickness by exact sixteenths of an inch.

It appears certain that the actual saving of weight is much less than 18 per cent., but as to the exact amount of the ratio and whether it is sufficient to pay a good interest upon the increased cost, there is still room for much difference of opinion. Two valuable papers have been read upon the subject before scientific societies recently, one by Mr. Denny of Glasgow, before the Iron and Steel Institute in May last, the other by Mr. Price, of Jarrow, at the autumn meeting of the Institution of Mechanical Engineers at Newcastle. Mr. Denny as a result of some few years experience in steel shipbuilding, is of opinion that steel ships are a profitable investment even

at the present (which he believes to be but temporary) high price of steel; Mr. Price on the other hand, having gone into the question with a view to designing some steel ships, is so firmly convinced of their unprofitableness that he recommends all his clients to have iron vessels. It may be of some interest to our readers to have these two views of the question placed side by side with some of the facts and figures respectively adduced in their support.

Mr. Denny gives as the result of his experience in building steel ships, that the saving in weight varies from thirteen to fourteen per cent. only. He gives the figures for an iron spar-decked steamer of 4,000 tons gross, compared with those for a similar vessel built of steel. The iron purchased for the first amounts to 2,333 tons, the metal for the second is 2,030 tons, which gives a difference of just over 13 per cent. It may be remarked that there is less scope for the 20 per cent. reduction on scantlings in a spar-decked vessel than in a full three-decked vessel, for the reason that the scantlings are smaller, and for the same reason still less could be as a rule gained by building awning-decked vessels of steel. Of the 2,030 tons, there are required for deck-houses, coal-bunkers and other parts of the vessel which do not contribute to her structural strength, no less than 340 tons. In these no reduction is practicable; when made of iron they are as thin as is consistent with the necessary rigidity, and mild steel is less rigid than iron. Mr. Denny also tells us that although mild steel has been used for forgings they have not seen their way to reduce the weight of these. It is thus the case that 381 tons of the metal are not subject to reduction at all. In the remaining 1,952 tons of iron, the reduction obtainable in practice is found to be $18\frac{1}{2}$ per cent., but this reduction is in cubic contents only, and since mild steel is found to be $2\frac{1}{2}$ per cent. heavier volume for volume than iron, the total weight of steel used in place of iron is 1,631 tons, which, with the indispensable iron upon which no reduction is practicable, gives the total weight of metal required for a screw steamer as stated at the outset. In this estimate the amount of metal paid for is taken; the actual weight in the ship is less than this by 9 per cent. in each case for waste scrap, and thus the increase in dead-weight capacity becomes 276 tons, that is, 7 per cent. upon the figures of

the gross register tonnage. Mr. Denny states as the result of his experience that this rate is pretty nearly constant, that is, that the figures of the increased dead-weight capacity obtained by using steel in place of iron in the same design may be obtained by taking 7 to 7½ per cent. of the gross register tonnage. The net cost of the iron in the iron steamer would be at the present rate £14,500, and in the steel steamer the total cost of metal would exceed this by £3,574. The extra dead-weight capacity of 276 tons is thus paid for in construction at the rate of £13 per ton.

The next step is to consider what the value of the extra capacity would be. Of course, this would vary with the voyage. Mr. Denny selects the Indian trade and estimates that the extra net gain would in two years nearly pay the extra cost of the steel steamer. "That this argument," he says, "is appreciated by the great steam companies, is proved in the case of the London and Calcutta trade by the fact that all the latest orders of the Peninsular and Oriental Steam Navigation Company and the British India Company, the two leading lines of steamers upon that route, have been for steel vessels. At the present moment these companies are building between them nine steel steamers of over 4,000 tons gross."

We have not space to follow Mr. Denny in a comparison of an iron steamer with one built of steel of slightly smaller dimensions, but which, in consequence of the smaller weight of the structure, is able on a less displacement to carry the same cargo. In this case a considerably larger sum is paid for the smaller vessel, but the gain is said to be a decrease of draught and a smaller taxable tonnage. We do not think, however, that the best comparison can be made in this way. If two vessels have exactly the same dimensions, their expenses of propulsion, &c., are the same, and in this case it is possible and easy to set off on the one side the extra prime cost and on the other the extra earning capability, both due merely to the substitution of one material for the other.

Mr. Price, of Jarrow, who may to some extent be taken to represent the practical experience of Tyne shipbuilding, comes to an entirely different conclusion from that of Mr. Denny. The figures given by him, however, did not represent the case of a steel vessel actually built, but only a comparison of the weight and

as much in her upper works as below, and an inconsiderable addition to the ballast tank would be all that was necessary to compensate for the slightly larger actual decrease in weight below over that in weight above her centre of gravity. Mr. Price's figures were called in question, and it was seen by his reply, and by a further explanation, that his estimate of the extra dead-weight capacity was understated.

It is however, we think, clear that experience with vessels of the Clyde type of passenger steamers is not conclusive as to the gain or otherwise of using steel for steamers of the Tyne district type, which are usually exclusively cargo carriers of low speed.

In two vessels of extreme types, but of about the same size, the net cargo capacity may in one case be two or three times that of the other, hence an addition of so much cargo capacity free of all drawbacks, would in the latter case be worth two to three times as much as the former. In the sailing ship, or in the slow steamer running short voyages, the gain might not be worth the extra cost, while in the fast passenger ship, especially in the case of very long voyages, it would be worth many times the money paid for it.

Some valuable particulars were in the course of the discussion given by Mr. Rogerson, of actual facts with regard to a steel vessel built in 1877 for the Bilbao ore trade at a cost of £18,350, that is, £1,350 more than she might have been obtained for, if built of iron. The gross extra earnings of this vessel due to increased carrying capacity, have amounted to £840 per annum, and after deducting from this the cost of discharging the extra cargo, and the extra insurance, &c., there still remains a yearly gain of £560 which is a very fair percentage upon £1,350.

The present price of steel plates and angles for shipbuilding is still more than 50 per cent. in excess of that of iron, and there appears no probability at present of much material decrease. One great reason for the difference in price is the severe testing to which the steel is subject. This is, however, as we have often urged in these pages, a necessary concomitant of the reduced scantlings; without it the extra quality in the material cannot be secured to compensate for the reduced size.

OUR SEAMARKS.—III.

LIGHTHOUSE ILLUMINATION.

IN our last chapter we dealt with the subject of lighthouse towers; we now propose to consider the nature of the lights exhibited from their summits.

From wood to coal, from coal to candles, from candles to oil were the transitions through which lighthouse illumination passed in years gone by. Numerous projects have from time to time been put forward in connection with the sources of light for lighthouses, and trials have been made with the lime light, the oxhydrogen light, the Bude light, the Voltaic light, and sundry other tentative applications of scientific discoveries, but they have all failed to meet the practical needs of the lighthouse service in a sure and satisfactory manner. Gas and electricity have however been more successfully applied, and are in some places being made available, while the combustion of oil has been so developed that very remarkable results have been obtained. There is no doubt that at the present time the very latest scientific knowledge is applied to render the lights of lighthouses of the greatest service to mariners.

Oil is the source of light employed at the large majority of stations on the British coasts, and we therefore shall devote a short space to a description of how it is employed. Gas and electricity will be considered in due course.

Previously to 1846 the animal oil obtained from the sperm whale was used in lighthouses. This oil was very costly, and attention was called to the economy which would result from the use of the vegetable oil expressed from the seeds of the rape and other cruciferous plants. The change was made from the animal to the vegetable oil with satisfactory results, and rape or colza oil for many years was exclusively used. Of late years, however, serious rivals to colza have arisen in the mineral oils obtained from shale, and Boghead cannel coal, familiar to all under the name of paraffin, or from petroleum. For a long period a strong prejudice existed against these mineral oils by reason of their tendency to give off inflammable vapour.

a low temperature, but by the careful elimination of the more volatile portion of these oils that danger has been so reduced as to enable them to be employed with safety, although long after they were thus rendered safe the prejudice continued to operate against them. The temperature at which a mineral oil gives off inflammable vapour is known as its flashing point, and so long as this flashing point is above 130° F. there is little danger to be apprehended by an explosion. There is much popular ignorance still prevailing in reference to the burning of these oils, and perhaps a few simple observations on the subject might be useful. It should be first borne in mind that when oil of any kind is burned, the actual liquid is not ignited. By the action of heat the liquid is converted into vapour or gas, and the application of flame to this vapour will cause it to burn. In the case of mineral oils, if this vapour be mixed with atmospheric air in a free state, this burning will take place very rapidly and assume the character of an explosion. But in no case will the vapour ignite unless a flame is applied to it; it will not explode spontaneously. From the foregoing it will be plain that if a mineral oil, be it paraffin, petroleum, benzoline, crystal oil, &c., does not yield combustible vapour at a heat below 130° F., there is not much danger in handling it. In burning the oil in a lamp a wick is used for the purpose of bringing the oil up to the top of the burner. The lower part of the wick is in the oil, and by what is known as capillary attraction the oil gradually creeps up the wick; imagine then the wick saturated up to the top; apply a light to that part of the wick which rises above the edge of the burner and the heat of the flame will convert the oil at that point into vapour and will at the same time ignite the vapour; the lighted vapour will then continue the manufacture of more vapour or gas, and the oil so converted into vapour will continue to be replaced by capillary action, and so the lamp goes on burning. In the act of burning, the vapour combines chemically with the oxygen of the atmosphere, and as oxygen is the chief supporter of combustion, it follows that the more effectively oxygen is supplied to the flame the more perfect and vigorous will be the burning of the vapour. One great difference between colza and paraffin is that it requires much

surface of the flame. The glass chimney serves to protect the flame from irregular puffs and draughts of air. Some recent improvements made by Mr. Jas. Douglass, the Trinity House Engineer, have resulted in these lamps being rendered available for burning either colza or paraffin and in yielding a splendid light with either. The alterations consisted in an arrangement for lowering the level of the oil when burning paraffin, in altering the tips of the wick case and in inserting a perforated conical button point downwards in the centre of the burner, whereby the current of air ascending the tube is more effectually thrown into the flame and combustion more effectually promoted. Associated with each lamp is a reflector of twelve or twenty-one inches diameter, for the purpose of reflecting forward all those back rays of light, which would otherwise be lost. The burner has to be accurately adjusted so that the flame is exactly in the focus of the reflector, and when it is so placed, all the backward rays are caught and reflected forward in such a manner that they go out to sea with the direct rays from the front part of the flame. The reflector is made of copper, the inner surface being coated with pure silver which is capable of receiving a very high polish. The catoptric system in lighthouses is applied to revolving lights more than to fixed lights, with an arrangement of three faces, each face having seven or ten lamps, and it can easily be imagined that as each group comes round it throws a splendid body of light on to the sea. The magnificent lights at Cromer on the East Coast, Beachy Head on the South Coast and St. Agnes, Scilly, are catoptric, each having three faces with ten lamps and reflectors on a face, making thirty lamps and reflectors at each station. As the flame of each lamp has to be maintained at a height of $1\frac{1}{2}$ inch, there is naturally great heat developed in the lantern by the burning of these thirty lamps, and it is therefore considered prudent to continue to use colza in preference to paraffin oil at these stations. This system, is, however, gradually being superseded, and it is probable that before many more years have passed away lamps and reflectors in lighthouses will be things of the past.

The single lamp used for dioptric lights is placed in the middle

of the lantern, and the burner is supplied with oil either on the hydrostatic principle or by means of pressure, that is to say, the oil is either a cistern fixed somewhere near the lamp, but at a higher level than the burner, from which the oil flows to the burner by the natural action of gravitation; or by means of a weight adjusted to the amount of pressure required the oil is forced up to the wick from a reservoir placed underneath the burner. The latter is the principle in general use at most lighthouses in the United Kingdom, and although it involves the winding up of the weight rather often it is generally regarded as being the more efficient system. The most noteworthy feature of this lamp is the burner, which by the way has been the subject of much controversy, with which we do not propose to concern ourselves. This burner is in the first place available for using animal, vegetable or mineral oil, and equal results as regards illuminating power can be obtained from them all, therefore the question of expense is the ruling consideration. The wicks employed are concentric, *i.e.*, ring within ring, and the number employed varies from one to six according to the power of light required. In many lighthouses four wicks have been used for a long period, yielding a very serviceable flame, but of late years, since the introduction of the six-wick burner, a great number of the lighthouses have been fitted with burners for six wicks. According to the calculations of Mr. Douglass, the Trinity House Engineer, the value of the light given by a six-wick burner is equal to that of 722 sperm candles, while the four-wick burner yields a light equal only to that obtained from 328 sperm candles. One of the great advantages claimed for the six-wick burner is that when the weather is clear three of the inner rings of flame can be turned down, thus effecting an economy in the consumption of oil, the full power of the six wicks being reserved for those occasions when the atmosphere is thick with rain, snow, mist, haze, or fog. The diameter of the flame of the six-wick lamp at its broadest part near the tip of the burner is 5 inches, but it is narrowed in the upper part to $3\frac{1}{2}$ inches by the glass chimney, which is made with a shoulder, above which the cylinder is much narrower. The height of flame usually maintained is about six inches. It is evident that such a body of flame must develop considerable heat, and the keepers have to exercise the

greatest care to prevent frequent breakage of the glass cylinders. When burning colza, the wicks are raised about a quarter of an inch above the top of the burner and the oil is caused to overflow the top of the burner ; but in burning paraffin the wicks are raised about one-sixteenth of an inch above the burner tips and the level of the oil is about $1\frac{1}{4}$ inch below.

The four-wick lamp is still in use at the majority of stations, but the use of the six-wick lamp is being gradually extended. At some lighthouses where a powerful light is not required three-wick and two-wick lamps are in use.

The consumption of oil, whether colza or paraffin, for a four-wick lamp, is about 1,100 gallons a year. In consequence of the six-wick lamp being sometimes burned at full and sometimes at half power, it is not possible to say accurately what the annual consumption of such a lamp should be, but probably it may be stated as about 1,750 gallons.

(To be continued.)

OUR KNOWLEDGE OF STORMS AT SEA.

PROBABLY no branch of weather study has had more thought and labour devoted to it than the Law of Storms. It would seem, however, that it is now somewhat taken for granted that all that can be discovered for the guidance of the mariner with regard to storms has been already done, and that there remains nothing of value on which he can be informed. It may be both interesting and instructive to refresh our memories on a few points, with a view of determining whether we are fully justified in resting content with our present knowledge on this subject.

When opportunity offers for a comparison to be made of the records of two or more ships in different parts of the same disturbance, there is ample proof that our present knowledge of storms is not sufficient to enable anyone to come to a safe conclusion from the observations of an isolated ship, for the observations of each ship in the same storm will often fix quite a different position for

lines, but this point was yielded for the convenience of the engraver.

* * * * *

"The degree of vorticular inclination in violent storms must be subject locally to great variations; but it is not probable that on an average of the different sides it ever comes near to forty-five degrees from the tangent of a circle, and that such average inclination ever exceeds two points of the compass may well be doubted."

Other quotations might be made from Redfield equally as strong in support of indraft. Piddington clearly shares the opinion of Redfield on the matter of indraft, yet his tables and horn cards treat the storms as purely circular. Reid in his "Law of Storms," Vol. II., p. 29, states the experience of a commander of one of the royal mail steamers, that by keeping the wind on the starboard-quarter, when in a revolving storm in the Northern Hemisphere, ships gradually sailed from the storm's centre; and similarly by keeping the wind on the port-quarter when in the Southern Hemisphere. This would seem to be fully recognising the effect of indraft and agrees precisely with the recommendation of Captain Toynbee, to which further allusion will be made presently, but yet after a study of Reid the conclusions end in a purely circular theory.

Thom, though treating storms throughout as strictly circular, makes the following remark at p. 241 of his work on the "Nature and Course of Storms;" when speaking of Espy's theory:—

"But it is acknowledged that a centripetal tendency exists at the surface of the earth in all storms attended by diminished pressure of the atmosphere towards the centre, for it is physically impossible that it could be otherwise. It is simply denied that the air rushes in straight lines from every point of the exterior of the circle to the focus."

The little work issued by the Admiralty, called "Remarks on Revolving Storms," also treats storms as purely circular; indeed it has been drawn up from the authors mentioned above, and a table is given from Dove's "Law of Storms," showing the bearing of the centre always at right angles from the wind experienced.

been made to utilize data of a recent date to confirm or disprove the conclusions arrived at. The material on which the circular theory is founded, and indeed on which it is still based at the present day, dates back 30 or 40 years, and it can readily be conceived that at that time the data were far more scanty, and probably less trustworthy than those now obtainable.

Some work throwing light on this subject has been done of late years, and among the principal may be mentioned Meldrum's "Notes on the Form of Cyclones in the Southern Indian Ocean," published by the Meteorological Office. The shape of the whirl in these storms is found to differ considerably from that of a circle, and the figure, when inverted to allow for the change of hemisphere, is found to agree well with the shape obtained by Captain Toynbee for the hurricane which blew to the southward of Newfoundland, in August, 1873, a discussion of which was published in the *Nautical Magazine*, Vol. XLVI., page 1,142, and more in detail by the Meteorological Office. Captain Toynbee found the indraft in this storm to be about $2\frac{1}{2}$ points, and he remarks that the only modification which these facts suggest is, that when the circular theory states that a ship ought to run before the wind, these facts show that, if possible, she ought to keep the wind well on the starboard-quarter in the Northern Hemisphere, and on the port-quarter in the Southern Hemisphere, because running dead before the wind would bring the ship nearer to the centre. Other conditions are mentioned which must guide the navigator before acting. The indraft given by Captain Toynbee is confirmed in a remarkable manner by Mr. Clement Ley for the cyclonic winds of Europe, though it must be borne in mind that the shape of a storm may be materially affected by the influence of land.

Indian meteorologists have also arrived at similar conclusions with regard to indraft for the storms of that part of the world, and with reference to those of the Bay of Bengal, Willson says:—"With the face to the wind, the direction of the centre is from ten to eleven points to the right-hand side."

Of the North Atlantic storms, the West Indian hurricanes which occur from July to October are undoubtedly of the greatest violence, but generally speaking their rate of progress is less than

against this with a powerful and well-found steamer, where time is of chief importance.

A careful watching of the swell often affords the mariner good warning of an approaching storm, and any change in the direction of this swell gives a valuable clue to the bearing of the centre of disturbance from the vessel. Without doubt, many commanders handle their ships in a storm in the best possible manner, but it must not be forgotten that good seamanship existed over 200 years ago, for in 1667 an English fleet, under the command of Sir John Berry, put to sea before a hurricane and came back safely in four or five days.

It is scarcely satisfactory to show the imperfection of our present knowledge without attempting to offer some suggestion for its improvement; but such improvement cannot be brought about until further information is gained. What is absolutely necessary for this inquiry is a large number of ships carefully observing the wind and barometer; and where practicable, well distributed on all sides of a storm. Of course such a disposition of floating observatories would be purely accidental, and it often happens that if a special storm is chosen for discussion, the material available is not so distributed over the area embraced by that storm as to yield a satisfactory result. The advantage to be derived from a thorough discussion is so great that doubtless by a scheme properly worked, the whole floating population might be induced to co-operate in the movement. It would be altogether impossible to obtain observations from too many ships, indeed the whole value of this style of work consists in a large number of accurate observations.

If all merchant vessels afloat in the North Atlantic were to record one observation at a fixed and uniform hour each day, and if these observations were charted in position for each day, we should have a synchronous and synoptic picture of what was going on over the whole of the North Atlantic. With such charts for one year it would probably be possible to satisfactorily determine the true shape of a storm, and at the same time to track all that occurred,—and possibly explain the beginning and end of a storm, about which we at present absolutely know nothing. Thus we might hope to obtain the solution of many a vexed question,

such as whether or not storms travel across the Atlantic from the American waters to Europe ; and by a study of the conditions over Europe prior to the arrival of a gale, we might be able in future to foretell storms with greater certainty and perhaps with longer notice than at present.

Who can estimate the value of additional light thrown upon such a storm as that which occurred in England on January 18th of the present year, when over a hundred vessels were lost off the coasts of the United Kingdom, incalculable damage was done to property ashore, and great loss and inconvenience caused by the almost unprecedented suspension of traffic due to the heavy snow-fall which accompanied the storm ? Or to take another instance which occurred very shortly afterwards, the storm which passed over Scotland during the first week in March, when nearly a hundred vessels were lost off the coasts of the United Kingdom (chiefly Scotland), and on the Scotch coasts alone 200 lives were lost.

It is impossible to over-estimate the value of such a series of charts, bearing in mind our present knowledge of storms. It is surprising that the undertaking has not been already grappled with ; attempts it is true have been made but the periods have not been sufficiently long, nor the observations sufficiently numerous.

The cost of such a piece of work as that suggested would, at the utmost, be but two or three thousand pounds, which is insignificant compared with the loss in money value of a single vessel, to say nothing of the lives. Doubtless the light thrown upon the storms of the Atlantic would be the cause of saving many a vessel, and with the tracks of the Atlantic gales well determined, and good types of the various gales for the different seasons, a commander might make a gale serve his own ends in effecting a quick passage.

The North Atlantic has been kept to the front for several reasons. In the first place the shipping interests of England are greater in that ocean than in any other, and the large number of vessels traversing that ocean would admit of more satisfactory results being deduced ; and further, without doubt, storms there met with would be typical of those in all other oceans.

"HORRORS OF AN EMIGRANT SHIP."

(By our Medical Correspondent.)

HOW often are the public to be startled by this worn-out old tale? The alleged horrors are periodically investigated and invariably resolve themselves into airy nothings. Like the house built upon the sand, the foundations are so rotten that at the first breath of truth the whole unsubstantial fabric crumbles into dust and falls to the ground. One would almost imagine that the British public were by this time so accustomed to hear the cry of "wolf, wolf," dinned into their ears that they would at last refuse to believe the animal to be at large. But there is a vast amount of ignorant credulity in the world, and there is always a certain number of what the Claimant calls "people with brains" ready to play upon this credulity, and the result is that these fabulous stories obtain a certain amount of credence and require to be disproved as they arise. There is an old saying, "Throw as much mud as you can, some of it is sure to stick," and it is therefore necessary to brush off this mud as often as it is thrown, and so preserve the garment from the slightest taint.

Our readers are well aware that the latest of these sensations emanated from the facile pen of a lady, who evidently set about her work in the spirit of the old song—

"For oh it is an 'orrible tale,
'Twill make your faces all turn pale,
Your eyes with grief will be overcome,
Twiddle, twaddle, twiddle twaddle twum."

It will be wasting the time of our readers to enter minutely into the charges of Miss O'Brien against the steamship companies—they will remember the stories of the enormous hammocks containing upwards of one hundred people of both sexes mingled indiscriminately together, of innocent young girls having to undress in the presence of men, and unable to get out of their berths except over the writhing bodies of their fellow creatures; of slave ships, floating brothels, dens of wickedness and whitening sepulchres. These and other abominations, are they not all recorded in the pages of the *Pall Mall Gazette*? Those who ran

may read. These charges, it is well-known, were taken up by the Irish land leaguers, debated in Parliament and made the subject of an inquiry by the Board of Trade, and thus the fair authoress much to her own surprise, awoke one morning and found herself famous. The inquiry instituted by the Board of Trade and conducted by the indefatigable Assistant-Secretary of the Marine Department, Mr. Thomas Gray, was minute and exhaustive, and the result is that it has been conclusively proved that the major portions of the statements of Miss O'Brien are pure myths, having their origin solely in the too vivid imagination of the writer, and having no existence whatever in objective reality. Like a huge soap-bubble, which inflated with air appears of imposing size but when pricked vanishes almost entirely, leaving but a very infinitesimal residue of soap and water, so her astounding tale when divested of fiction and brought to the test of solid fact gradually appears "small by degrees and beautifully less," till the residue is small indeed. It was proved by overwhelming testimony that the enormous hammocks she imagined she saw in the *Germanic* were simply canvas berths, patented by Mr. Dewar of the White Star Line, and which have received the unqualified approval of the Emigration Officers and Medical Inspectors of the Board of Trade. As Miss O'Brien has, without meaning to do so no doubt, done the patentee a great amount of injury by her rash assertions, we take the present opportunity of administering an antidote to the poison. These berths, five in a row, are composed of canvas and are separated from each other by a canvas partition about six inches in height. In each compartment or room there are two rows of these berths on each side one above the other, and the rooms themselves are shut in by a canvas screen extending from the deck above, thus securing privacy to each. The great advantage of this patent consists in the fact that in the daytime these berths are rolled up, and a table suspended above is let down to take their place, thus giving a much greater amount of room than the ordinary wooden berths which are fixtures. Moreover, being so much softer than wood, mattresses can be dispensed with as in hammocks. At the end of the voyage these canvas berths are taken down and washed, and are thus perfectly

clean again for the next batch of emigrants. When Miss O'Brien paid a second visit to the ship she acknowledged that she could not reconcile what she saw with her first impressions, neither can anyone else. Possibly, the first time she took a bird's eye view from the gangway during the daytime when the screens between the rooms were removed, and seeing a large spread of canvas, she imagined there were but two huge hammocks; just as a person in a balloon ascending a lofty height and getting above the clouds, cannot detect the irregularities of hills and valleys on the surface of the earth; or as unassisted by a telescope the surface of the moon presents to us one dead level.

It was proved at the inquiry that the rule observed in all the lines is, that the single men are berthed by themselves in the fore part of the ship, and are, as a general rule, completely bulk-headed off from the rest of the passengers—the married people with their children under twelve years of age are berthed together, either in a separate compartment altogether or in enclosed rooms containing from twelve to twenty-four berths. The single women are berthed by themselves, either in an entirely separate part of the ship, bulk-headed off from the rest of the passengers, or on the same deck with the married people in enclosed rooms—the latter is the more general plan adopted. Such being the general arrangement it will be at once apparent that the assertions that hundreds of men and women are mixed indiscriminately together, and "that any man coming on board with a woman who is or calls herself his wife, sleeps by night in the midst of hundreds of young women who are compelled to live in his presence night and day," are fictions pure and simple not even founded on fact. Then again, the idea that if a young woman wishes to leave her berth she can only do so by treading on the writhing bodies of men and women," is so palpably absurd as scarcely to need contradiction. Seeing that the beds are arranged in a row on each side of the room with a passage between, as Miss O'Brien must have seen if she went into the steerage at all and looked about her, it is obvious that the only means of exit is at the foot of the bed, and therefore if she has to tread upon any one at all it must be on one of her female companions who perhaps had managed

However, this is a progressive age, and we are far from saying that everything is as perfect as it might be, and that there is no room for improvement. Let us then endeavour to sift the few grains of wheat from the vast amount of chaff which has almost hidden them from sight, to separate the little streaks of gold from the large quantity of dross. Anyone reading the blue-book containing the reports of the inquiry, will observe that Mr. Gray has put his finger upon certain blots in the present system, and that the Board of Trade have suggested certain improvements which no doubt the shipowners will readily adopt, since they are all feasible and some one of them already exist in most ships. We will discuss these suggestions *seriatim* :—

First—"They think that the communications of the single women and of the married people with the deck should be such that each class may have their communications separate from those of the other classes and so that one class shall not pass through the compartments of the other." This is an important suggestion, and if carried out will necessarily make in many cases somewhat extensive alterations. At present, very often the single girls and married people are berthed in enclosed rooms but on the same deck, in some cases the married people are on one side of the deck and the single women on the other, in others the single women are in the aft portion of the deck and the married people forward, but with no bulkhead separation between the rooms. It is clear that if the above suggestion is carried out in the spirit intended, it will necessitate a complete separation by a bulkhead of the two classes. If this were done, we should be glad to see, at least as far the single men and single women are concerned, the system of enclosed rooms done away with altogether, the ventilation would be very much improved thereby. Even in the case of the married people it would be much better if the walls of the room were made of open trellis work, which would prevent anyone looking in, but would not stop the free entrance of air—this is done in some cases.

Secondly—"They think that every emigrant ship should be provided with water-closets and urinals in the following proportion. Four for the first hundred emigrants and one for every fifty

afterwards, and that no emigration surveyor or officer should regard as satisfactory any arrangement of these things which does not keep a certain number set apart for females, and placed that neither the male passengers nor the crew can use them without being instantly detected, and that these water-closets and urinals should be kept well supplied and flushed with water. The latter part of this suggestion is generally carried out at present and no doubt the first part will soon follow. We entirely agree with Mr. Gray's idea that arrangements should be made whereby females could get to the closets and lavatories without going on the weather deck. On all those covered-in ships that have a main-deck for exercise below the weather deck this is carried out, and in one line it exists without these conditions, the closets being covered in and approached by a separate stairway. It would be a great improvement if universally adopted, for there is no doubt that in dirty weather the women and children will go on the upper deck to relieve themselves, particularly at night time, and if an outbreak of diarrhoea should occur the consequences may be more easily imagined than described.

Thirdly—"They think that every emigrant ship should be supplied with lavatories for each class of passengers, well supplied with water and other conveniences, and that these lavatories should not form access to the water-closets." No doubt it is most important for the sake of cleanliness that there should be lavatories supplied with *fresh water*, soap and towels. Most of the lines are now introducing lavatories, but there is ample scope for improvement in this direction.

Lastly—"They are disposed to agree with Miss O'Brien that every emigrant ship carrying a certain number of single women should have a woman of experience and character in the position of matron." This is a very valuable suggestion and it is carried out on some lines at the present time, the only difference being that such a person rejoices in the name of stewardess, but so long as she is experienced and well up to her work and not merely selected for the voyage from the passengers, it comes to the same thing. It is sometimes urged that respectable women will not stay in the steerage but want to be transferred to the cabin.

Of course the little tips in the cabin materially increase the wages of the stewardess, but this should be allowed for in the scale of pay—we fancy after all it is only a question of money. No doubt it would be the duty of a matron to look after the morality and decency of the girls, but if Miss O'Brien fancies she should endeavour to prevent all flirting, kissing, and sky-larking during the day, then all we can say is, "the matron's life is not a happy one." We are somewhat inclined to think that the married people and children require a person of this description quite as much as the single girls. Miss O'Brien has been obliged to confess that many of her first statements cannot be substantiated or at least fully proved, and so one by one she has gradually abandoned her outer line of defences, and now falls back on the stronghold which she considers impregnable, viz., the total separation of the sexes. Unquestionably there is a great deal to be said on behalf of her views, but then again there is much to be said for the opposite side, and the question is therefore a somewhat difficult one to determine. Now, if girls over the age of twelve are not allowed to be with the married people, we do not think there is any question of morality in the matter, there is no doubt the different husbands and wives may be trusted to look pretty well after each other. But if the question of morality is not involved, that of decency certainly is, and if we consider that the women may have to climb up into the upper berths, with some of the men perhaps watching the process, well,—our own notions of propriety certainly sustain somewhat of a shock, and under similar circumstances we should prefer our own wife to go with the single women. But then again people's ideas of decency depend entirely on their antecedents, on the way they have been brought up. The foreigner's ideas are not those of the Englishman's, and the ideas of the lower class of Englishmen are not those of the upper. What is one man's meat is another man's poison. There would be very great difficulty in compelling foreigners to separate from their wives, they are essentially gregarious, and would have some vague idea that there was some nefarious design against them, and be inclined to mutiny. Moreover, the German and Scandinavian men as a rule act as the nurses and look more after their children than the women do.

Possibly if an Act was proposed compelling all the companies to separate the sexes, it could be carried out, but it would be a serious consideration whether the result would not be to divert many of the passengers to ships sailing under a foreign flag. After all it is only a question of feeling. If they don't mind it, what business is it of ours? Why should we try to make everyone see with our eyes—*chacun à son goût*. We English are a little inclined to modesty, and are somewhat prone to act on the principle, "assume a virtue if you have it not." At the same time there may be many decent young English couples whose modesty would not be shocked at the publicity in question, and we therefore think that in all cases there should be the option of separation, and that this should be printed on the contract tickets so that there might be no mistake about it. If the system of intermediate passengers were more fully developed it would meet many objections; a great many would gladly pay £2 extra for the additional comfort.

Miss O'Brien now acknowledges that most of the shipowners go beyond the requirements of the Act, and she therefore directs her final attack against the Act of Parliament itself, and here certainly she has more solid ground to stand upon. The Passenger Act of 1855 and 1863, are somewhat antiquated and may possibly require revision, but there is no question of urgency in the matter and it may well stand over till more important subjects have been disposed of. If, as is admitted, the shipowners go beyond the Act it is evident that the emigrants themselves do not suffer from it—at the same time it is as well that Acts of Parliament should not lag far behind the actual conditions of things, or people may begin to ask what is their use. When, therefore, the time arrives for this revision, the most important amendment in our opinion required will be that of the 22nd section. In this section provision is made for the separation of all males of fourteen years and upwards, but Miss O'Brien is quite right in saying that there is none whatever for single girls. This, therefore, now depends entirely on the right feeling of the shipowners, and it is very much to their credit that they have not taken upon themselves to insist upon all girls over twelve years of age being berthed together. The scale of diet in the Act is also somewhat out of date, and the amendment required would

inctly in the interests of the shipowners. It is well that this scale is not now adhered to, that passengers are very much better than required, that fresh meat is given every day, and biscuits may be had *ad libitum*. Nevertheless ships are obliged to have on board a very large quantity of beef and pork, which is very little used, and is often thrown backwards and forwards till it has to be sent on shore. A large amount is necessary in case of accidents, but the quantity might be very much reduced. We can testify from our observation that as a general rule the emigrants going across the Atlantic are fed better than they have ever been in their country before, or than they are likely to be again; and when, therefore, letters are published from any of them complaining of being half starved, it is sufficient to condemn the whole case, and to say of the writers, in the words of the poet Butler—

“ Quoth Hudibras, you lie so ope,
That I without a telescope
Can find your tricks out and descry
Where you tell truth and where you lie.”

Mr. Brien's sensational letter, Mr. Gray closes his report with valuable suggestions, the text of which is as follows :—The last amendment of the Passengers Act is now eighteen months old. Since that date great alterations and improvements have been made in the carriage of emigrants, and in the arrangements for their accommodation and comfort. In a great many cases shipowners have voluntarily, wisely, and in their own interests, gone a long way ahead of the requirements of the Act, and experience has shown us they are constantly studying and improving the arrangements for emigrant accommodation in their own country and has shown them that the more liberal and perfect and comfortable their plans and terms, the more certain are they of securing the best part of the emigrant trade, and I cannot but think that any statutory enactment or any further departmental action can be of so much service in securing safe and healthy carriage for emigrants or for any body, as the fortunate competition

which is now allowed to exist. In regard to the food: statutory scale is exceeded in the best lines; biscuit lockers left open, and emigrants can help themselves all day long, in open casks of biscuits are left about the deck; soup, rich in st and most excellently prepared, is served out; in the White lineteapots and hot water are provided for the use of the females; I learn on the very best authority that emigrants on landing New York are very often several pounds heavier than when embarked at Queenstown. In receiving complaints against quality and quantity of the food supply, I am informed that date on which the alleged deficiency arises is of importance many emigrants who have a long railway journey before to secrete as much as they can towards the end of the voyage, if in doing so they have to stint themselves for a day or two.

"I must, however, say that some lines carrying emigrants though those lines do not necessarily sail from Liverpool, have yet found it necessary to adopt all the improvements of the lines. I should be very chary of suggesting any special alteration in the practice of any of the best lines, but I think it is open to your consideration whether some general suggestions may not be made which, whilst they will not interfere with the good lines, may bring others, chiefly those not sailing regularly from Liverpool up to a better standard. The experience of the officers of the Board of Trade has enabled them and myself to form an opinion upon the many good features in the practice of each line, and there is no doubt that if all these improvements could be brought together in each ship, an advance would be made on even the existing arrangements of the most approved lines.

"From consultation with our own officers, and from the evidence given to me, and from the observations and information I have been able to gather personally and verbally on my various inspections, I will endeavour to arrange the very few suggestions I have even now to make under the following heads:—

"1st. *Matrons*.—I am convinced that it is a very desirable thing to have a woman of character and experience in the position of matron on board every emigrant ship carrying single women. Such a woman in her capacity of matron ought to act as

al supervisor of the comfort and conduct of the single women steerage. In so far as any suggestion Miss O'Brien may made in this direction, or may have intended to make, I concur with her. In using the word 'Matron,' I desire a very marked distinction between a 'matron' and a mere dress or waitress, in the ordinary acceptation of these latter. I do not propose that a 'matron' should be one of the emigrants selected for the voyage, nor that she should be of charwoman, nor a drudge to wait upon the women and men in the steerage. This latter sort of person the emigrants do not need. They can very well attend to their own wants without the assistance of such a person, and moreover, if they cannot, easy to find persons among the emigrant class who will and can do the menial work of such an one.

Among the duties of such a matron as I propose, she should be present at meal times, should receive complaints, if any are made, that any single female passenger or young person does not get the due allowance of food or proper attention; she should play the part of an ever present domestic inspector, and her special duty should be to encourage decency and order, and suppress any disorder amongst the single females. She should, I think, have a plain or distinguishing garb, and should report at least twice a week, and oftener when necessary, to the doctor and purser or other appointed officer.

She should be required to sign the articles of agreement, and be amenable to discipline, and responsible for neglect of duty, and she should be a person of experience at sea. A woman without 'sea legs' or without the knowledge of routine duty on a ship, is not a fit person for the position I think should be given to a matron.

If one or two lines matrons are carried, on some lines neither nurses nor stewardesses are carried for the steerage passengers. If a stewardess is appointed from among the passengers, usually or when necessary, for sea-sickness or other cause, when the ship has gone to sea. This is an arrangement that may be the special case of emigrant passengers being sent to hospital, in special cases, but it is not, I venture to submit, suitable

for general purposes, nor an arrangement that can be regarded as satisfactory on the whole. I am completely informed of the reasons and terms that generally govern these appointments in existing circumstances, but it is unnecessary that I should enter on them in this report.

"Emigrants' Berths.—In some lines canvas berths have been introduced. There is no doubt whatever that this system is highly conducive to the comfort of the steerage passenger, although this system of berthing seems to have misled Mr. O'Brien. In the opinions of our practical officers, they are good, and therefore desirable from a sanitary point of view. They can be rolled up in the day time, and thereby admit of a thorough circulation of fresh air through the sleeping quarters of emigrants, which is an advantage of the utmost importance, indeed of the very first importance, if emigrants are to be landed in good health. That arrangement which consists of supplying wooden berths with planked bottoms, is not, I have reason to believe, so satisfactory as such emigrants as cannot afford to bring on board or to buy their own emigrant's mattress, as in the canvas berth which Miss O'Brien (under the erroneous term 'hammock') condemns.

"But here again the larger question of cost comes to the fore. If shipowners can by the arrangement of a wooden or plank bedstead afford to the emigrant a cheaper passage, I cannot see why the practice should be interfered with.

"Water-closets.—In every one of the ships of the lines carrying emigrant passengers from Liverpool there are efficient water-closets; that is to say, efficient 'arrangements' plentifully flushed with water, which at sea carries away all impurities and all odours.

"In these days it may seem strange that I should have to draw a distinction between so-called 'privies' and so-called 'water-closets.' The Acts, however, make a distinction between the two, and 'privies,' that is to say, things without water, are still in existence in ships, some of them Atlantic liners carrying passengers. I certainly think that all these arrangements, and also all urinals, should, as they are in the best lines, be arranged so that by means of the machinery on board they should have a plentiful and constant flow of water through them at sea, so that no accumulations

filth and no unwholesome odours can come from them to find their way to any part of the ship.

"The Act requires at least two 'water-closets' for women (not only when more than fifty are carried), shall be provided, and requires not more than twelve privies or closets on any ship, whatever the number of emigrants on board, or however large the ship may be. When a large number of emigrants is carried, the responsible officers on my staff tell me that they do not believe that twelve is really a sufficient number. Our conclusion is that water-closets properly flushed should be provided in the following proportions :—

"Four for the first 100 emigrants, and one for every 50 afterwards, and that no emigration surveyor or officer should regard as satisfactory any arrangement of these things which does not keep a certain number set apart for females, and so placed and arranged that neither the male passengers nor the crew can use them without being instantly detected.

"A point arose in this inquiry that was not satisfactorily settled. It is whether arrangements could not be made whereby females in the steerage could get to the closets and lavatories without going on the weather-deck. It is, I think, worth consideration whether the water-closets should not be immediately above the emigrant decks, and be so situated as to ensure the utmost amount of decency and protection against weather. For instance, females' closets might be aft, and the males' closets forward with an entry from below, so that it need not be necessary for any one to be exposed to the inclemency of the weather in order to reach those places at night or in the rain.

"This point is one which, as I have said, is well worth consideration, but I can make no positive recommendation on it as it involves questions of arrangement if not of construction of the ship; and considerations as to the general health and convenience of persons other than emigrants.

"*Lavatories.*—All the best lines have lavatories, although I regret to say that one or two lines may still be found without them. It is difficult to conceive anything more condemnatory of any emigrant ship than to be without them, nor anything more

conducive to the comfort of the emigrant passengers than the to retire to such a place to change linen and wash the children or themselves.

"In some lines baths are provided, and in others hot and water is laid on, both of which are steps in the right direction both can easily be provided.

"The only remark I think it desirable to make on some of owners who have provided lavatories (though not required by Act), is that they should extend their practical morality a further, and make such arrangements that the lavatories should not form a thoroughfare to the water-closets.

"It will be a useful credit to the owners, and a very great to the female passengers and young children.

"*Ladderways.*—There are few points upon which great improvements can now be made, than in the present arrangement of ladderways to the emigrant passenger decks. From inquiries I have made of various competent persons, and especially of members of my own staff, who are daily conversant with these matters, and from my own observation, after making visits to and runs in these ships, as opportunity has offered during the last twenty years, I think that the ladderway to each deck should be caged off in such a manner as to leave the free and unimpeded use of the whole of the ladder to the occupants of each deck; in my own opinion is, that on no account should a ladder reaching from the weather-deck to the upper or passenger deck be common to the occupants of the lower passenger deck; and it is still more important for the comfort and convenience of the passengers, that ladderways should not be arranged in such a manner that single male or female occupants of a lower passenger deck should be obliged to make a thoroughfare of the upper passenger deck (where single persons of the opposite sex are or married couples may be berthed) to get to the ladder leading to the weather-deck. It may of course be necessary for the ladderways from both decks to pass through the same hatchway, but hatchways are sufficiently large to admit of the ladder from the lower passenger deck being caged in from deck to deck.

"*Carriage of Live Cattle in Emigrant Ships.*—A point has arisen

on which I asked several questions during my inquiry, whether some of the steamers that bring large numbers of cattle home from the Continent of America can be sufficiently cleansed and deodorised to make them fit for carrying emigrants outwards in space between decks which has been occupied by cattle inwards. This point is regarded as serious by some of our best and most experienced officers, and may need the careful consideration of the sanitary officers of our staff at no distant day.

“ Varying Requirements with varying numbers of Passengers.—

I must here however state that there is not only a marked difference between the arrangements of ships on different lines, but that there must necessarily be a marked difference between the arrangements on board of ships of the same line under the different and varying circumstances of different voyages. The number of passengers varies, and the numbers of single males and single females, and of children varies, and therefore the arrangements must vary. To illustrate my point I would refer to the arrangements for berthing passengers on board the *Germanic* (on the occasion of Miss O'Brien's visit), arrangements really perfectly satisfactory in every way; and to the excellent but entirely different arrangements on the Inman steamer *City of Paris* (*see* question 246) on the occasion of my visit to her, where five nationalities had to be put into separate compartments. There can be no hard and fast line, and although I have done my best to make a report on the basis of the general and broad conditions under which every-day work connected with the conveyance of emigrants is carried on, I cannot be responsible for describing, any more than can the shipowner in arranging for, the special and varying wants and arrangements of special and varying circumstances and voyages; nor can I in the limits of this report explain the differences of practice between the arrangements on emigrant vessels at various ports of the United Kingdom.

“ This report would, however, be imperfect if I failed to mention one fact connected with conveyance of emigrant passengers, and it is this, that technically ‘ emigrant passengers ’ are all those persons who are not saloon or cabin passengers, and that certain so-called ‘ emigrant passengers ’ now travel in apart-

landed at that point within three hours afterwards. Now the positions of the *Asterope* are given for the 6th and 7th of July, 1881,—that on the latter date being within a mile of the supposed position of Resolution Shoal. But the two positions of the *Asterope*, stated to have been determined by observation, give a definite course and distance which, however, in no way coincide with the courses said to have been steered and the distance said to have been run in the interval between the two dates,—and this, irrespective of any allowance for the well-known Westerly current of not less than half-a-knot an hour in that locality.

Surely it should have been the duty of the nautical expert who prepared the case for counsel to have pointed out these discrepancies for the guidance of the Court, which might then have been more cautious in giving its decision as to their being "little doubt" as to the shoal on which the *Asterope* struck. That the *Asterope* was by misadventure stranded somewhere on the north coast of Brazil is certain, but the exact position is quite uncertain, though the evidence given in Court and the statements in the annex to the Report of the Court tend to the supposition that the shoal was not very far south-eastward of the position marked "Buckle, P.D." It might even not be found if sought for, since it is well-known that *temporary* shoals, at the distance of ten or more miles from the land, and very dangerous to navigation, are being constantly formed by the silt of the large rivers in that part of Brazil; five vessels were reported lost in this locality in 1879, and several since.

But our chief objection to the report lies in another direction, where it discusses the relative values of charts; we quote the paragraph in full—it is at best but a rambling one; and we shall then test its worth.

"The second question which we (the Court) are asked is, 'Whether the master was supplied with proper charts of the east coast of South America?' According to the master's engagement with his owners he had to supply his own charts, and not having been on this part of the coast of Brazil before he provided himself before leaving Cardiff with one of Imray's charts, on which, as we are told, Resolution Bank is not marked, although it is clearly

together with other important hydrographical information, and cautionary sailing directions, be put in comparison with Imray's chart showing the navigation between Cayenne and Maranhao, and including the spot where the *Asterope* was stranded. The chart published by the private firm is in every way superior to that published by the Government department; and lest it be supposed that the former is an enlarged copy of the later, we are enabled to state that both are compilations—both based on the same originals—French and Brazilian surveys, with corrections to date.

But the Court's answer to the question is a continuous harping on the value of Admiralty charts. We readily acknowledge their excellence, and the care displayed in their production: but we give equal credit to the private firms. It is futile to suppose that the Hydrographic Office is wholly original as to its productions; a very large, certainly the largest, part of its duties must be compilation and translation. The colonial and foreign sources of information, which are very numerous as well as excellent, are accessible to private firms as well as to the Admiralty, and what is more they make abundant and *immediate* use of them, the information reaching the one on the same day as it does the other. As a matter of fact, we ourselves receive a great number of publications and announcements from foreign governments in reference to new lights, newly discovered rocks and shoals, and other hydrographical information which we publish monthly for the benefit of our subscribers.

The principal omission in the report of the Court is the fact that the *Asterope* was admittedly navigated by a chart published in 1879, and therefore at a date anterior to the loss of the *Resolution*. An Admiralty chart of the same date would have been in a like condition with the "blue" one—the *Resolution* Shoal would not have been shown upon it. Had this fact been noticed in the report, the Wreck Commissioner might then have gone on to quote the Board of Trade *Notice to Owners and Agents respecting Charts*, issued in 1876:—

"The attention of the Board of Trade has frequently of late been called to cases in which British vessels have been endangered or lost through the masters attempting to navigate them by means

of antiquated or otherwise defective charts, the Board of Trade desire, therefore, to direct the special attention of shipowners and their servants and agents to the necessity of seeing that the charts taken or sent on board their ships are corrected to the time of sailing."

This is proper, and to the purpose; there is no reference to Admiralty or private publications;—only, whichever they be, avoid antiquated or otherwise defective charts, and let them be corrected to the time of sailing. The Court's opinion was asked on a special point, and there was no response to the main issue.

The Wreck Commissioner's Court must act judicially *and with justice*, and we trust we may, in this respect at least, have been enabled to put it on the right tack. It is not so very long ago that in that Court an Admiralty chart was spoken of as correct, and recommended on that account in preference to any other, when it was notorious that Admiralty and private publications were equally in error with the foreign original.

Query.—When the accuracy of a chart is in question, would it not be simple justice to have the publisher in Court to give his version of the default, if any?

COAST DEFENCES.

NO system of home defence would be perfect without a secure harbour on the east coast of England of a capacity sufficient to moor a fleet of twelve ironclads and a reasonable number of small craft. By using three ground chains for each set of moorings, an area of 207 acres will accommodate fourteen first-class ships, allowing four to be each 400 feet in length, and ten of 300 feet, with an interval between them of 100 feet when swinging stern to stern. It is not desirable to tie up very heavy ships by the head and stern if there be a possibility of a ground swell rolling into the port, for the scend causes more strain than is desirable on the hull and cables. Another reason is that in time of war simplicity is

mooring will render a fleet more serviceable in a sudden emergency than the other system possibly could.

This harbour, if constructed, would not only be useful as a base of operations for the North Sea fleet should a European war involve England as a principal, but during peace its importance as a port of refuge for the hardy seamen of the coasting trade cannot be over estimated. At this moment, from the Firth of Forth to the Humber, there is not a single place into which a windbound or disabled vessel can enter at low water. A few years since the writer saw a large fleet from the Thames standing off and on an east coast port waiting for the signal to cross the bar. As the gale increased in force and the fringe of sand laden breakers became higher and widening rapidly to seaward, considerable anxiety was evinced by the numerous spectators on shore for the safety of some of the lighter ships. Although carrying a press of sail, many were unable to hold their own, so that before the tide ball was hoisted they had dropped so far to leeward as to be unable to weather the pier heads. Seeing this their helms were put up and the vessels beached as experience directed—I believe on this occasion without loss of life. When the signal to enter was made the scene became very exciting, a sail for life, indeed, during which much damage took place before all were securely berthed. But had the tide been later it is impossible to say what amount of life and property would have sacrificed. From that time my impression of the necessity of a secure port on that wild coast has increased in intensity, and the fact of Germany probably becoming a first-rate naval power at no remote epoch must not be lost sight of by those who are responsible for the safe keeping of our shores from invasion and our flag from insult. Great nations cannot, in the present age, follow out a particular line of policy, but are compelled to take part in European movements whether they desire it or not. The much vexed Eastern Question, the Egyptian, the Tunisian, and many others, plainly indicate that it is impossible to stand aloof when great and burning events are in progress in the diplomatic world. Those who will not move with the stream run a risk of being overwhelmed by it. We cannot if we wish always remain

neutral when our neighbours are fighting, and there are occasions when it is undignified to do so.

England from affinity of race and political circumstances for centuries lived in profound peace with Germany, and respective peoples mutually admire the great qualities they share in common. Still we must not forget that political considerations are often stronger than family ties, and Germany, with an extensive seaboard, would become a more dangerous rival to England than France ever possibly can. The sailors of the former nation as well as those of Holland, are in no wise inferior to ours in any point, and to take them *en masse* they are in some respects superior, notably in age and weight. At present we may say of them what the great Napoleon is alleged to have said of the English infantry—"It is a good thing there are not more of them." Our crews have the advantage over ours of serving long together, while the English Navy lose many, if not a majority of its best men in the flower of manhood, at a time when at a great expense and trouble they have acquired a thorough knowledge of their profession; in fact, when they have become intelligent trained men the fleet requires. In another point Germany is stronger than England. By a different régime the former can command the services of every seaman in the Empire. Unless the press gang system were again legalised, almost an impossibility, it is much to be feared that the supply of British seamen would not equal the demand; reserves sailing in the China, Indian or Australian seas are practically useless in modern wars. Indeed it is not too much to say, judging by the experience of the few years, that a war might be begun and ended before many remote stations were aware of its existence. From this fact it is evident that England's reserve of seamen should be drawn from the crews of coasting and fishing vessels rather than from the foreign trade. In physique the former are certainly superior to the foreign-going, and in intelligence and conduct not inferior. Why then should they not be preferred when their services could at a few hours' notice be made available on an emergency?

It is somewhat singular to contrast the jealous watchfulness of this country towards France with its unbounded trustfulness

of Germany. If the former plants a gun on the shores of La Manche, we immediately, to use an Americanism, duplicate it at Portland and Southsea. But the erection of an impregnable fortress and war port at Williamshaven is almost unknown to the great mass of our countrymen, as well as the contemplated establishment of a naval harbour and fortress at Dantzic. The most ordinary tourist will speak of the batteries of Cherbourg and its commodious arsenal, but of that grim fortress on the shores of the North Sea he has not a word to say, and is probably unaware of its existence; yet the day may come when it will be as jealously watched by an English fleet as Brest and Toulon were during that long revolutionary war which almost lasted a generation, seeing men who were in their cradles at the outbreak fighting in its ranks at the close. Modern warfare spares mankind these endless wars, crowding into a short space of time a sufficiency of misery and disaster to humble one if not both of the contending belligerents.

At present there does not appear to be any thorough system of coast defence organised throughout our Empire, and there are grave reasons for inferring that if a maritime coalition were formed against England more would remain to be done than the generality of military and naval men at present realise. We want a grand National Station Bill, in order that when the tocsin sounds every man can silently take up his appointed station in the chain of defences. To what ships are the thousands of our Naval Reserve men told off? to what gunboats or batteries the splendid body of Artillery volunteers that a few weeks since justly excited so much admiration in Windsor Park? to what use is it contemplated to put our hardy second-class reserve men? Are we to wait till the proclamation of war has been read on the Royal Exchange before the programme is worked out? And, if not, is it wise to wait any longer for this much-needed Station Bill? Of what use will all our numerus unorganised levies be if every detail has to be carried out under the pressure of actual war? When that comes the heads of the great departments of State, in whose hands the working of this formidable machine rests, should only have the levers to mani-

pulate in lieu of setting the rods and valves in place under There are doubtless many officers whose great technical knowledge would enable their services to be utilised in carrying out this necessary improvement in the volunteer movement afloat and shore. The limbs are there with all the strength of youth and manhood to bear them up, and a guiding head is alone required to make the whole one of the most formidable and economical weapons of defence this or any country has ever seen. With perfect organisation popular movements lose half their usefulness or fail hopelessly in the hour of trial.

At present it seems that the services of Naval volunteers are assumed to be for home defence only, and in order to perfect the system gunboats should be numbered off for the particular parts of the coast that an enemy might be expected to attack. It is, of course, the regulation that the address of each volunteer is known to the authorities, so that a few hours' notice would enable them to call out any portion of the force near a threatened point. England is vulnerable in so many places on her long coast line that the loss of the command of the sea, a mischance which might temporarily mislead the commander of the Channel fleet, or any of the chances that may occur in war if men have the genius to seize them, shows how necessary it is to perfect a plan before efficiency is put to the test of active service. It is not wise to accept absolutely the versions given of the state of our defence at great public banquets. Much that is said there has no meaning, but it reassures the public mind if captious critics have been asking troublesome questions on a subject which of late has been present to many minds, *i.e.*, the questionable nature of the silver streak as a perfect line of defence. So long as the empire of the sea depended on the topsails of sailing ships, England had nothing to fear from any possible combination of European navies. We are sailors innately in a far higher degree than the French are soldiers, and were able not only to hold our own in every part of the globe, but masters wherever a ship might swim. The continental powers acknowledged this great quality. Englishmen slept quietly when the Channel fleet was at sea, and her convoys were seldom harried by the ene-

Steam has changed all this, sailing is becoming a thing of the past, its place being supplied by steam and electricity. It is doubtful if the present generation can so far forget their early traditions as to take kindly to the changes which science is constantly making, and this is relatively a source of weakness in comparing the present with the past. On the other hand foreign seamen have no such proclivities, and gladly embrace a system more congenial to their habits than that induced by a life spent almost wholly on the ocean. It matters little to what quarter of the globe we turn to see how correct this assumption is. English seamen would, a quarter of a century since, have smiled contemptuously at the idea of John Chinaman engaging a brig of war with any craft of a similar type he might be able to build or purchase. But who will say, now he is ensconced behind the turrets and guns of a modern gunboat, that he can be treated with contempt should disturbances crop up in the eastern seas. In the Pacific, Chili has become a formidable maritime power, whose officers fought a recent naval action with such ability and science, that every word of the dispatches should be carefully perused by all who take an interest in their profession. The *Huascar* was pounded by her principal opponent as coolly and scientifically as a professed pugilist would have pounded a novice. The lesson should be taken to heart by all whom the chances of war may some day place in a similar position. Quick firing in former battles at sea was an advantage when ships were alongside and every shot told its tale of death in passing through a wooden hull. Armour fourteen inches in thickness makes it necessary to pick out, when practicable, a vital spot to aim at. It was this method of fighting that proved fatal to the *Huascar*, and probably annihilated the naval power of Peru for a generation to come. Turn where we may a similar state of things is seen, ironclads, gunboats and torpedoes appear to be the object of the ambition of the smallest of powers. To secure this end the peasant of more than one State is taxed to the verge of starvation, progress is at a standstill and the financial position of the country trembles in the balance. As the battle between torpedoes and guns has yet to be fought it is evidently

unwise to put too many eggs in one basket. It was this fact that induced me to condemn, in that part of my article published in the year's volume of the *Nautical Magazine*, page 194, devoted to Colonial defences, the proposition of Sir W. Jervis to build ironclads for the defence of their ports; Sir William may be assured that if ever a hostile flag is seen in those seas it will fly from the ensign staff of a light cruiser, not from the masthead of an ironclad. It is difficult to surmise in what manner this universal arming will end. Doubtless national vanity is at the bottom of much of the movement, but whatever may be the true cause it is certain that a watchful eye and constant thought are required to fathom the complications which are now seething in the restless brains of more than one people. To do this effectually there must be no dependence on allies, a nation that cannot stand alone in the defence of its honour quickly disintegrates and gives place to one with more vitality and strength of will.

It may not be amiss to conclude this paper with an extract relating to that of the defences represented by the *Minotaur*, *Agincourt*, and the *Northumberland*.

We live in such an era of change in all that appertains to naval architecture and gunnery that no subjects require more watchfulness and study by those who are interested in the supremacy of England on the ocean. Every change or invention at home or abroad should be carefully gauged, and if it bids fair to be of service must, regardless of expense, be immediately adopted. In the long run such a judicious course of action ensures economy and, what is of more importance in the hour of peril, a self-confidence that disaster would fail to shake. It is by these means that Germany has now risen to such a height of power as to occasion a species of uneasiness in every Court of Europe. She stole a march on Austria by the introduction of the needle gun in her armies; one on England by the erection of Williamstown; and one on France by the superior organisation of her military system, while Napoleon and his gallant subjects were basking in imaginary power at the Tuileries and giving forth oracular speeches to ambassadors which it was vainly imagined would please or scare as they deemed fit. Such an impressi-

lesson as this should never be lost sight of by the people of this country, and as they ponder over it let them remember that every enemy who has landed on her shores has entered London as a conqueror. To allow such an event to come to pass in this the nineteenth century would not only bring a lasting disgrace on the English race, but entail consequences on the world which it probably might require generations to obliterate. At any cost we must never permit an enemy to land, for the moral effect cannot be discounted. With a force of trained seamen at command, backed by an efficient Naval Reserve in a powerful squadron of gunboats, he would be a bold general to attack such a stronghold as England ought to be in this the zenith of her power.

Before proceeding further it may not be amiss to take a quiet look through the Navy List and ascertain what the true fighting force of the country really amounts to. In order to prevent confusion, we will, as far as possible, separate the ships into classes, for there is such a variety of type that it would be difficult to otherwise convey an adequate idea of their capabilities. At the head of the list in tonnage, in horse-power, and in symmetry stand the *Minotaur*, the *Agincourt*, and the *Northumberland*. They are grand conceptions of modern engineering, comparing favourably with such structures as the Britannia Bridge across the Menai Strait; but while the latter will for generations fulfil the purpose for which it was constructed, the ships are already of the past, almost as much so in comparison with the *Duilio* as the old-fashioned three-decker is with an ordinary ironclad. The guns of the *Duilio* can probably send a projectile through the armour of the *Minotaur* from a distance beyond the extreme range of the armament of the latter. This is a fact that cannot be gainsaid; and in summing up the naval strength of the empire, and comparing it with that of a possible continental combination, deserves to be carefully weighed before striking a balance.

The engines of these ships are as obsolete as the hulls, the consumption of coal at full speed is certainly 120 tons per diem and to quote the remark of an engineer "as much more as you like to give them." It is doubtful if, with this amount, an average speed of eleven knots an hour could be maintained for twelve consecutive

hours ; but supposing it possible, the bunkers could not long stand such a drain. Although they are capable of being handled with the greatest ease under any condition that can arise in ordinary steam tactics or harbour service, their length makes circling a tedious process ; the diameter of the circle at a speed of ten knots being about 643 yards. If opposed to a twin-screw ship of a superior speed commanded by a good officer she would certainly be rammed without difficulty. The question arises, is it possible to remedy this most dangerous defect or are we to live on in the hope that the contingency alluded to will never arise ? Men of the genius of Sir E. J. Reed and Mr. Barnaby, who converted wooden line-of-battle ships into, at that time, formidable ironclads, would find no difficulty in turning these obsolete ships into really effective ones, for their framing and general strength has on more than one occasion stood tests to which few have been subjected. When the *Agincourt* was landed on the Pearl Rock she was for a time hung amidstips, but the most rigid tests in the graving dock failed to detect the slightest straining, although the bending moment must have been prodigious ; no slight tribute to the skill of her designer and the careful supervision of the Messrs. Laird. Another practical illustration of the strength of these ironclads was afforded by the drifting of the *Northumberland* on to the ram of the *Hercules* during a heavy gale at Madeira. Notwithstanding that several plates were torn, and portions of the double-bottom filled, she steamed to Malta for repairs without a hitch.

If these ships were converted, masts should be discarded, for they are an unquestionable source of danger in action. It is marvellous how little it takes to throw a shaft out of truth. A lead or patent log line coiling between the boss and the propeller-post will effectually do it, and probably finish by breaking the shaft or destroying the brasses. This is not a theoretical assertion only, but one founded on the results of actual experience. The tendency to cling to royal yards is unfortunately still in vogue to the detriment of efficiency for active service. As a rule, any fitting which will splinter, ought, as far as practicable, to be expunged from the list of equipments. When going into action, it should be a standing order to clear the spar-deck of every moveable article, boats

included, and let the victor take all. Engines are now brought to such perfection, that twin-screws render a complete breakdown, with ordinary care, an impossibility. We can no more successfully combine the qualities of a sailing ship with those of a first-class ironclad than we can make the wooden frigates their equals in a fighting capacity. The days of sail power for floating batteries are as much a thing of the past as the armour of the knights of St. John of Jerusalem would be to a modern infantry man. Both have had their day, and done good work in it, they are now only fitted for the museums of the curious, in order that the seamen of the future may learn with what rude weapons their predecessors founded their country's greatness. It is a heritage to be proud of, and although the present are living on the laurels of the past, there are no reasons for inferring that the courage, self-denial, or love of country, is inferior to that of former times. Wise legislation and humane treatment have converted the English man-of-war's man from a fighting animal into a thinking, rational man, requiring only to be well commanded to emulate when called on the deeds of those whose actions, if not their names are, imperishably connected with England's greatness.

W.

INDIA.—MADRAS HARBOUR.—The following *rules for regulating the entry and departure of vessels* using the Madras harbour are in supersession of those dated 26th January, 1881:—*Rule 1.* No vessel shall enter or leave the Madras harbour at any time without having on board a pilot or harbour master, unless authority in writing so to do has been obtained from the conservator of the port. *Rule 2.* Vessels about to leave the harbour shall hoist flag N. of the Commercial Code at the fore. *Rule 3.* Vessels about to enter the harbour shall hoist flag F. of the Commercial Code at the fore. *Rule 4.* Not more than one vessel shall enter or leave the port at the same time. *Caution.*—Masters or other persons in charge of vessels disobeying any of the foregoing rules will, on conviction before a magistrate, be liable to a fine not exceeding one hundred rupees (100 Rs.) for every such offence, and also to the payment of the costs of such conviction.—*August 3, 1881.*

ROYAL COMMISSION ON TONNAGE.

REPORT.

THE result of the protracted deliberations of the Commissioners appointed to inquire into the proper operation of the law for the Measurement of Tonnage has been published,* and the conclusions arrived at by the majority of the Commissioners are as follows:—

“Recommendations. Rules for admeasurement now in force to be amended. Rules framed suitable to iron vessels. Depth measurement of iron ships.—To carry into effect these conclusions we recommend:—

“(a.) That the rules for admeasurement now in force should be amended so as to give greater freedom to the authority charged with the duty of carrying them into effect and to insure the utmost accuracy in ascertaining the contents of spaces.

“(b.) That special rules, suitable to the present state of shipbuilding, be framed for the admeasurement of iron vessels.

“(c.) That the depth for the measurement of tonnage of iron ships should be from the tonnage deck to the top of the floor plates subject to a limitation as to the depth of the floor plates to be allowed in the measurement. In fixing this limitation regulations should be had to the breadth as well as to the depth of the ship.

“(d.) That gross tonnage should be made to include all permanently covered and closed-in spaces above the uppermost deck and that erections with openings either on deck, or coverings or partitions that can readily be closed in, should also be included in gross tonnage, but that skylights of saloons, booby hatches for crew, light and air spaces for the boiler and engine-rooms when situated above the uppermost deck, as well as erections for

* Those who wish to make themselves fully acquainted with the details of this subject should obtain a copy of the Report of the Royal Commissioners with copious notes and references, from Messrs Pewtress & Co., Great Queen Street, Lincoln's Inn Fields, W.C., price one shilling sixpence. In our opinion it is a very valuable publication, and makes the whole subject clear to anyone who will take the trouble to peruse it.

purposes of shelter, such as turtle-backs, open at one end, and light decks supported on pillars and uninclosed, should not be measured for the purpose of their contents forming part either of the gross or registered tonnage. Cargo carried under such erections should continue to be measured for dues under the Act of 1876, the same as if stowed on the open deck.

“(e.) *How register tonnage should be arrived at.*—That for the purpose of arriving at a register tonnage that shall, as nearly as is practicable, represent the actual space in a ship available for cargo, there should be added to the deduction at present made for crew space the contents of the master's cabin, provided it be used solely by the master and crew; and, further, that there be deducted the contents of spaces used for the working of the helm, the capstan, the anchor gear, and for keeping the charts, signals, and other instruments of navigation and boatswain's stores, and also the spaces occupied by donkey-engine and boiler if connected with the main pumps of the ship.

“(f.) *Further allowance to sailing vessels for sail-room space.*—That sailing vessels be further allowed a deduction for the space occupied by the sail rooms, this deduction not to exceed $2\frac{1}{2}$ per cent. on the gross tonnage.

“(g.) *Deduction for propelling space in steamers.*—That the deduction for propelling space in steamers should be the actual space set apart by the owner, at his discretion, for the engine and boiler-room and permanent bunkers, provided that such space be inclosed, separated from the hold of the ship by permanent bulkheads, and that the bunkers be so constructed that no access can be obtained thereto otherwise than through the ordinary coal shoots on deck, or in the ship's side, or from the openings in the engine-room or stoke hold; but that to meet the varying requirements as to fuel of steamers engaged in long voyages, and to encourage ample ventilation to boiler and engine-rooms in hot climates, owners of steamers should have the option to claim as deduction for propelling space the actual contents of engine and boiler space plus 75 per cent. thereon in the case of screw steamers, and 50 per cent. in the case of paddle steamers, without restriction as to extent, construction, and use of bunkers. Provided

always that the deduction for propelling space shall not exceed 33 per cent. of the gross tonnage of any screw steamer, and not exceed 50 per cent. of the gross tonnage of any paddle steamer.

"(h.) *Contents of spaces not first included in gross tonnage not deducted.*—That there shall not be deducted from the gross tonnage the contents of any spaces that have not first been included thereon.

"(i.) *Certain spaces above uppermost deck to be specified on certificate of registry.* Carriage of passengers and cargo in deducible spaces to be prohibited.—That the spaces above the uppermost deck that are measured into gross tonnage should be specified on their contents on the certificate of registry of British ships; and that the spaces whose contents are deducted from gross tonnage should in like manner be specified on the certificate of registry; and, further, that the carrying of passengers and cargo (including live stock) in spaces deducted from gross tonnage, be prohibited under penalties except under the second rule for deduction of propelling space.

"*Water-ballast.*—As regards provision for water-ballast seems to us that although double-bottom spaces may not be fitted for the stowage of cargo they often practically contribute to freeboard earning, inasmuch as the entire hold in such cases is available for light cargo, whereas a portion of the hold in a ship not fitted for water-ballast would be unremuneratively occupied by stone or other material for ballast. It is also manifest that a ship fitted with a double bottom on the bracket or cellular system is external dimensions larger ship and is capable of carrying more dead-weight cargo with a given freeboard, than a ship of the same internal dimensions and of precisely the same tonnage, constructed without a double bottom, or with double-bottom water-ballast on the McInnes system. It is, therefore, our opinion, notwithstanding the statements referred to in section 19 of this Report, that whilst, on the one hand, ships constructed to carry water as ballast should not have undue advantage in the measurement of tonnage over ships carrying other sorts of ballast; on the other hand they should not be placed at a disadvantage. We would leave owners at liberty to make such water-ballast arrangements as they please in each case, but we do not think that any water-ballast spaces which may

situated above the floor plates, or above the point indicated by the limitation as to the depth of the floor plates, should be exempted from measurement into tonnage.

*"Board of Trade should have power to modify details of admeasurement.—*The determination of all the details of tonnage admeasurement by Acts of Parliament, without possibility of modification, seems to us in some degree to hinder the free development of naval construction, and it would be for the advantage of the Mercantile Marine if the Board of Trade were empowered to modify these details to meet special and unforeseen alterations in the designs of ships:—a return of such modifications to be laid upon the table of the House of Commons within forty days of their introduction or of the sitting of the House.

C. M. NORWOOD.

J. STOKES.

E. J. REED.

THOMAS GRAY.

JAMES P. CORRY.

ROBERT CAPPER.

T. D. HORNEY.

WM. PEARCE.

T. B. ROYDEN.

(Signed)

"J. EDWARD WILKINS, Secretary,

" 25th August, 1881."

Three of the Commissioners dissent from the foregoing conclusions, viz., Mr. John Glover, Mr. B. Waymouth, and Mr. H. C. Rothery, and each gentleman gives at length his reasons for not agreeing with the majority.

Mr. Glover would like things to remain much as they are, with some further allowance for water-ballast space, and does not agree with the recommendations for altering the allowance for propelling space, &c.

Mr. Waymouth advocates a displacement measurement, that is to say he would have the tonnage of a ship to be "the amount of dead-weight cargo in tons of 20 cwt. which a ship could carry on a fixed load-line," which would be equivalent to the difference between the displacement of the vessel when equipped for sea, but

without cargo, coals or consumable stores, and when brought down by a weight of cargo to a fixed load-line.

Mr. Rothery goes further and proposes the measurement of total displacement of a vessel up to a fixed load-line without allowances or deductions.

It is not our purpose in this number to criticise the detail of the Report, nor the "reasons" of the dissentients; nor shall at present concern ourselves with the correspondence which appeared in the *Times* on the subject of "Displacement Tonnage," but we hope in our next number to deal with the subject at length.

THE NEW ASTRONOMICAL NAVIGATION.

By M. LE COMTE DU BOISY.

(Continued from p. 681.)

MÉTHODE DU POINT RAPPROCHÉ.

THE *method of equations of condition* can only be employed when approximate values of the required quantities are known: then, instead of directly computing these quantities, the corrections to be made to those approximate values are calculated, in order to obtain sufficiently accurate values of the required quantities. A ship at sea always possesses its estimated position, by dead reckoning; this position is always more or less approximate; consequently the *method of equations of condition*, can be applied to the determination of the place of the ship at sea, and in this case may be presented thus:—

Let A and A' , be simultaneous altitudes of two celestial bodies, observed at the hour T_p of the first meridian; L_e = estimated lat. by dead reckoning; G_e = estimated long. by dead reckoning; L = true lat.; G = true long.

Now let us for a time consider the latitude L_e and longitude G_e as accurate, and let us with them compute the altitudes of

bodies (see *Nautical Magazine* for 1880, p. 212); we obtain two azimuths Z_e and Z'_e , also two altitudes A_e and A'_e .

Let δL_e and δG_e , be the algebraic corrections to be added to L_e and G_e to get L and G ; that is to say, let us state the condition* :

$$L = L_e + \delta L_e, \quad G = G_e + \delta G_e$$

It is demonstrated that

- $$\begin{aligned} (1) \quad A - A_e &= \cos Z_e \delta L_e + \sin Z_e \cos L_e \delta G_e + a \delta L_e^2 + \\ &\quad b \delta G_e^2 + c \delta L_e^3 + \dots \\ (2) \quad A' - A'_e &= \cos Z'_e \delta L_e + \sin Z'_e \cos L_e \delta G_e + a' \delta L_e^2 + \\ &\quad b' \delta G_e^2 + c' \delta L_e^3 + \dots \end{aligned}$$

The second members of these equations are called *series*: they are composed of the algebraic sum of an indefinite number of terms succeeding one another according to a fixed law. In the present case the first two terms contain the unknown corrections themselves δL_e , δG_e ; the two following terms (in which a , b , a' , b' , represent certain algebraic combinations of the trigonometrical lines of the known quantities) contain δL_e^2 , δG_e^2 , and the other terms, δL_e^3 , δG_e^3 , δL_e^4 , δG_e^4 . . . and so on. The first two terms are of the first degree, the following of the second degree, and so on according to the figure of the exponent.

The kind of algebraic expression called *series*, may be compared to an arithmetical quantity into which enters a decimal fraction of an indefinite number of figures; for instance, the *ratio* of the diameter to its circumference which is 3.14159. For many calculations the number 3.14 can be employed as the true ratio, and the third, fourth and all other decimal figures neglected: in the same way it happens, very often, that in a *series* the terms of the degrees subsequent to the first can be neglected; and we will show later that it may be nearly always done in the case of the determination of the position of a ship.

This point settled, let us neglect the terms of powers higher than the first, in the equations (1) (2); then they are reduced to—

$$(3) \quad A - A_e = \cos Z_e \delta L_e + \sin Z_e \cos L_e \delta G_e; \text{ and}$$

$$(4) \quad A' - A'_e = \cos Z'_e \delta L_e + \sin Z'_e \cos L_e \delta G_e$$

* Hence the name, *equations of condition*.

and 4, on the magnitude of the latitude. It increases with the distance E O, the altitude, and the latitude; and also when the angle $Z'_e - Z_e$ approaches 0° or 180° .

In the *New Astronomical Navigation* the limits of the error O C are easily calculated. The determination of these limits shows that O C is nearly always very small or inappreciable; and that in extremely rare cases, when the distance E O (Fig. 2) and the altitude or latitude are very great, this error may amount to 5 or 6 miles; but even in these cases, the calculation of the *point rapproché* furnishes the means of obtaining the true place of the ship: for this purpose the point O may be considered as a new point by dead reckoning; with this re-compute the two *points rapprochés*; and thus another point, O', is determined which will be sufficiently correct.

It may be remarked that in cases where the altitudes are very great, and the curve of altitude may be replaced by a circle, the error O C is not to be feared.

(To be continued.)

CORRESPONDENCE.

FOG-SIGNAL AT BISHOP ROCK LIGHTHOUSE.

To the Editor of the "*Nautical Magazine*."

DEAR SIR,—Urging the importance of the subject as an excuse for trespassing so much on your valuable space, I venture to submit the following for your consideration, and hope you will grant it a place in the columns of your widely-read Magazine.

The great importance of the Scilly Islands as a land-fall in making the English Channel renders them of peculiar interest to seamen in general, and more especially to those employed in the steam service between ports in North America and on the east and south coasts of England, Germany, &c. Situated in the fairway of the Channel these islands claim precedence in every point which bears on the advancement and promotion of safe navigation in

these waters, and the noble lighthouse on the Bishop B erected with incredible labour at the expense of nearly £37, shows how urgently the need of a safeguard was felt to vessels from its dangerous vicinity. Now it seems unaccount to me that, with the precaution taken to render these formidable rocks perfectly safe and a boon rather than otherwise approaching vessels by night or day, *in clear weather*, no similar measure should have been adopted to render them equally safe in fog.

The uncertain set of the currents in the neighbourhood to the westward which depends principally if not altogether on the direction, duration and force of prevailing winds (of which the navigator bound to the eastward is necessarily ignorant), calls for great judgment, from which the element of hazard is at times not altogether eliminated, in the selection of proper courses. In thick weather the frequent stoppage necessary to procure a correct line of deep-sea soundings, could frequently give an erroneous result to the computed reckoning and there are circumstances under which it would not only be difficult, but attended with danger to a long vessel to stop for frequent soundings, as for instance, running before a heavy gale, sea, weather thick with rain or snow, when the only alternative left is to heave-to and await an improvement which may, perhaps, be days in making its appearance. The fog-bell at present in use at the Bishop is altogether inadequate for the purpose of warning vessels off the adjoining rocks, especially those which lie to the northward and north-eastward of the lighthouse should the vessel come from the westward, or indeed in any circumstance of wind. What is urgently needed, and I feel confident would be hailed as an inestimable blessing by all those navigating the Channel and its approaches, is a powerful syren-trumpet or signal-gun, not necessarily on the Bishop Rock itself, if that would not be practicable, but on one of the adjacent islands, whose sound would effectually embrace over and beyond all the outlying dangers to the northward and westward; a ship might then stand boldly for the land, and obtain a good departure for entering the Channel. It may be urged in opposition to this (though has

by those in the profession) that the confidence inspired by the knowledge of the existence of an efficient sound-signal might induce the mariner to run undue risks which would otherwise have been avoided ; to this I should unhesitatingly submit, that after days of fog, with nothing but an uncertain reckoning to depend on, more risk is run by keeping to the southward in order to avoid these dangers, and thereby entering the Channel on a low parallel, and working to the eastward without a sure position. Looking at such a signal, however, in the light of a warning only (ignoring altogether its importance as a guide), surely its necessity is of sufficient urgency to demand consideration from those in power, and I think there are many who will agree with me in saying that the construction of such would be a good work, and the means of saving many lives.

The experiments with the syren-trumpet recently made at South Foreland and elsewhere (an interesting description of which I lately read in one of your numbers) show that the eyes of the Trinity Board are fully open to the importance of constituting a more effective system of fog-signalling on our much frequented coasts than at present exists, and it is gratifying to observe the many improvements and additions which have been effected of late in the buoyage and light arrangements on our shores. I earnestly trust that fog-signalling may continue to hold a prominent place in the consideration of the experienced gentlemen who form its honourable circle, so that the greatest enemy that we have to contend against at sea may be divested of some of its terrors in these our English waters.

It is but justice to confess that our American and Canadian friends are a stride in advance of us in this branch of science. I have heard the fog-horn at Sandy Hook at over a distance of seventeen miles ; and that at Cape Sable at more than twelve, and then not with a favourable wind for conveying the sound, as the lighthouse bore N.W., or at right angles to it, the wind being from the south-westward. A warning at the Bishop of the same intensity would preclude all possibility of accident.

Since writing the above, I have been told that some articles bearing on the same subject have already appeared in your

columns, of this I was ignorant as (much to my own loss) only commenced taking in your Magazine in the spring of 1878. If such is the case I hope you will not in consequence debar this from publication, as if the subject has lain dormant for so many years it certainly requires reawakening as one of much importance to be allowed to remain in abeyance where much depends on its consideration.

I am, dear Sir, yours obediently,

J. H. MALET,

Master of s.s. *Marengo*, Wilson Line

S.S. *Marengo*, New York, September 5th, 1881.

MASTER'S AUTHORITY OVER PASSENGERS AT SEA.

To the Editor of the "Nautical Magazine."

SIR,—Will you kindly give me the benefit of your knowledge respecting the power a commander of a British merchant ship in regulating the conduct of all classes of passengers he may have on board, and while the vessel is at sea; as I fail to find in the passenger, or shipping Act, anything directly bearing on the subject. Considering that ships have reached such huge proportions that they resemble floating towns in regard to the number of persons on board, this question is now one of considerable importance. Hitherto I, as commander of a large mail and passenger steamship, have considered the laws at sea precisely similar to what are observed in England, and take upon myself the responsibility of magistrate. On shore when a man gets drunk and makes himself offensive to his fellow creatures, he is taken into custody and locked up. I act in the same manner with a drunken insubordinate passenger, with this difference, the passenger is usually confined to a cabin and gets his usual meals brought him, whereas, had he been on shore and committed the same breach of the peace, a police cell would be his place of abode for the time, with short rations. The passenger is kept in

finement until he is perfectly sober and promises amendment for the future.

Cases of assault, sometimes with intent to do greivous bodily harm, robbery, attempted suicide, which frequently happen on board passenger ships, have also to be dealt with by the captain with more or less severity to ensure good order and discipline among those under his care, for often we have the most desperate characters to deal with, when nothing short of prompt and in some cases severe punishment would save the ship from being turned into a floating pandemonium. There are books sent on board for our perusal containing Passenger Acts and Notices to Passengers, in which certain laws are to be observed by the owner of the ship and the captain, who, if they fail to carry them out are visited with heavy fines and penalties. But nothing is guaranteed as to the good conduct of the passenger while on board. He may with impunity get drunk, use obscene language, assault his fellow-passengers and make himself generally obnoxious. Is there no law framed for the guidance of the captain? I consider the commander of a passenger ship should be endowed with the same power as a magistrate and permitted to deal with cases of insubordination and any infringement of the laws of Great Britain, whereby he may ensure comfort, safety, security, and well-being to the hundreds of souls who are for the time being under his care and protection.

I trust, Sir, you may be able to treat of this important subject at an early date.

I am, yours truly,

EDWARD JONES, R.N.R.

Royal Mail Steamship, *Grantully Castle*.

[We propose to deal with this subject in our next number.—
ED. N.M.]

TIDE TABLES FOR OCTOBER, 1881.

Also Ports of Reference for the Constants in the next Table.

WEEK DAY	MONTH DAY	LONDON BRIDGE.		HULL.		NORTH SHIELDS.		LEITH.		DEVON- PORT.		DOVER.		WESTON- SUPER- MARE.		LIVER- POOL.		GREEN- OCK.		QUEENS- TOWN.		KINGS- TOWN.		LONDON- DERRY.		BREST.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
1	5	6.40	7.11	11.36	—	8.38	9.14	7.27	8.10	10.24	11.08	3.56	4.27	11.34	—	7.53	4.31	4.40	5.10	5.58	6.40	7.19	8.00	8.56	9.36	—	—
2	6	7.48	8.23	0.17	0.59	10.0	10.45	8.53	9.39	11.43	—	5.3	5.44	0.16	0.50	5.17	6.5	5.55	6.40	7.24	8.03	8.44	9.25	10.23	11.9	—	—
3	7	9.20	10.5	1.41	2.23	11.27	—	10.20	10.58	0.31	1.18	6.25	7.7	1.44	2.28	8.53	7.34	7.23	8.10	8.93	9.74	10.55	11.36	—	—	—	—
4	8	10.43	11.21	3.0	3.34	0.4	0.37	11.31	11.59	2.0	3.37	7.44	8.16	3.8	3.45	8.9	8.28	8.41	9.17	9.91	10.68	11.45	—	—	—	—	—
5	9	11.23	—	4.4	4.31	1.5	1.30	—	0.21	3.11	5.40	8.44	9.10	4.15	4.48	9.4	8.26	9.43	10.3	11.03	11.83	—	—	—	—	—	—
6	10	0.19	0.44	5.59	6.1	1.53	2.15	0.47	1.10	4.7	4.33	9.34	9.38	5.15	5.41	10.2	9.00	10.33	10.60	11.29	12.0	—	—	—	—	—	—
7	11	1.7	1.29	6.23	6.1	2.36	2.57	1.33	1.58	4.56	5.18	10.33	10.30	6.5	6.28	10.34	10.55	11.19	11.43	12.0	12.4	—	—	—	—	—	—
8	12	1.50	2.11	6.23	6.45	3.17	3.37	2.14	2.34	5.39	6.0	11.10	11.33	6.50	7.19	11.16	11.37	—	0.6	4.57	5.19	5.41	6.03	6.65	7.27	7.89	8.51
9	1	2.82	3.53	7.5	7.25	3.57	4.17	2.54	3.14	6.20	6.40	11.5	—	7.33	7.53	11.58	—	0.27	0.48	5.40	6.0	6.11	6.40	—	—	—	—
10	2	3.15	3.92	7.45	8.5	4.37	4.57	3.34	3.54	6.58	7.16	0.16	0.37	8.11	8.29	0.19	0.38	1.26	1.26	6.20	6.40	7.0	7.27	7.45	7.63	7.81	8.00
11	3	3.62	4.12	8.25	8.45	5.8	5.30	4.14	4.34	7.34	7.52	0.58	1.19	8.47	8.59	0.57	1.16	1.47	1.47	6.59	7.19	0.47	0.7	0.97	1.13	1.29	1.45
12	4	4.31	4.40	9.5	9.25	6.0	6.21	4.54	5.15	8.10	8.28	1.40	2.1	9.22	9.39	1.35	1.53	2.32	2.32	7.37	7.57	1.20	1.50	1.60	1.76	1.92	2.08
13	5	5.9	5.29	9.45	10.8	6.43	7.6	5.38	6.3	8.46	9.4	2.23	3.41	9.56	10.14	2.15	2.33	3.23	3.23	8.16	8.37	2.13	2.35	2.51	2.67	2.83	3.00
14	6	5.52	6.10	9.41	11.4	7.32	8.1	6.29	6.57	9.28	9.46	3.5	3.28	10.55	11.0	3.58	3.26	4.47	4.19	9.0	9.24	3.6	3.84	4.01	4.17	4.33	4.50
15	7	6.41	7.10	11.38	—	8.35	9.13	7.29	8.5	10.15	10.48	3.54	4.23	11.31	—	4.54	4.23	5.40	5.13	9.65	10.33	5.60	6.33	6.53	7.19	7.50	8.20
16	8	7.44	8.21	0.15	0.52	9.02	10.32	8.45	9.20	11.25	—	4.56	5.31	0.8	0.46	5.10	5.38	5.48	6.26	11.12	11.51	5.19	5.40	5.61	5.82	6.03	6.24
17	9	8.9	9.46	1.28	2.3	11.9	11.43	10.36	0.4	0.44	6.6	6.41	1.25	3.2	6.34	7.10	7.41	—	0.27	6.21	6.57	6.94	7.31	7.68	8.05	8.42	8.79
18	10	10.24	10.56	2.26	3.8	—	0.14	11.7	11.35	1.23	1.64	7.16	7.48	3.37	3.10	7.43	8.19	8.15	8.45	1.1	1.33	7.28	7.54	7.81	8.08	8.35	8.62
19	11	11.26	11.52	3.38	4.3	0.42	1.6	11.59	—	2.20	2.67	8.15	8.36	4.4	4.8	8.67	8.93	9.11	9.34	3.2	3.26	8.24	8.47	8.71	8.95	9.19	9.43
20	12	—	0.13	4.24	4.43	1.34	1.42	11.20	0.30	3.21	3.44	8.57	9.17	4.33	4.55	9.16	9.33	9.55	10.13	3.47	3.7	9.8	9.97	10.15	10.33	10.51	10.69
21	1	0.35	0.62	5.1	5.19	2.0	2.17	0.54	1.12	4.6	4.39	9.36	9.55	5.16	5.34	10.40	10.57	10.70	10.87	3.27	3.46	9.45	9.63	9.81	10.00	10.18	10.37
22	2	1.10	1.28	5.36	5.53	3.33	3.48	1.20	1.46	4.45	5.8	10.13	10.31	5.65	5.86	10.40	10.57	11.10	11.25	4.22	4.40	10.18	10.37	10.56	10.75	10.94	11.13
23	3	1.45	2.1	6.10	6.27	3.4	3.50	2.2	2.18	5.21	5.80	10.50	11.10	6.39	6.50	10.58	11.17	11.46	—	4.40	4.59	10.48	11.4	11.67	11.86	12.05	12.24
24	4	2.18	2.84	6.45	7.3	3.38	3.56	2.35	2.52	5.67	6.12	11.00	11.31	7.11	7.39	11.36	11.57	—	0.24	5.16	5.37	11.22	11.43	11.64	11.85	12.06	12.27
25	5	3.51	3.9	7.40	8.21	4.15	4.34	3.10	3.29	6.33	6.51	—	0.11	7.48	8.1	—	0.14	0.44	6.26	6.47	—	—	—	—	—	—	—
26	6	3.26	3.47	8.0	8.21	4.54	4.73	3.49	4.0	7.0	7.24	0.32	0.53	8.55	8.4	0.33	0.53	1.24	1.41	6.35	6.56	0.2	0.45	0.70	0.95	1.20	1.45
27	7	4.27	4.43	9.4	9.61	5.50	5.70	4.30	4.53	7.43	7.68	1.15	1.39	9.4	9.24	1.13	1.34	2.24	2.41	7.17	7.39	1.5	1.73	1.95	2.17	2.39	2.61
28	8	4.40	4.57	10.27	10.52	6.23	6.43	5.18	5.43	8.00	8.24	2.5	2.28	9.45	10.4	1.57	1.34	3.46	3.63	8.40	8.63	1.63	1.86	2.09	2.31	2.54	2.77
29	9	5.05	5.22	11.0	11.27	6.93	7.13	5.83	6.08	8.69	8.93	3.5	3.28	10.4	10.4	2.57	2.34	4.46	4.63	9.40	9.63	2.63	2.86	3.09	3.31	3.54	3.77

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

ing the Tidal Constant of the place, according to its sign (+ add, the time of high water on the given day at the port of reference, you ae of high water at the place sought.

E.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
	H. M.			H. M.	
.....	-1 17	Leith	Jersey (St. Helier)	+2 38	Brest
.....	-3 52	Liverpool	Kinsale	-0 18	Queenstown
.....	+2 59	Brest	Lerwick (Shetland) ..	-3 47	Leith
.....	+5 13	Dover	Limerick	+1 15	Queenstown
.....	-0 42	Leith	Lisbon bar	-1 17	Brest
.....	+0 50	Brest	Littlehampton	+0 24	Dover
.....	-2 25	Kingstown	Llanely bar	-0 38	Weston-s.-Mare
.....	-0 18	Greenock	Lowestoft	-4 1	London
.....	-1 49	Leith	Lynn & Boston Deep ..	-0 29	Hull
ur	-1 14	Queenstown	Margate	-2 18	London
idge	-0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
.....	-0 2	Brest	Milford Haven entr. ..	-0 58	Weston-s.-Mare
& Rye bay	+0 8	Dover	Montrose	-0 52	Leith
.....	-0 51	Liverpool	Morlaix	+1 6	Brest
.....	+2 42	Londonderry	Needles point	-1 26	Dover
.....	-1 5	N. Shields	Newcastle	+0 23	N. Shields
.....	-0 8	N. Shields	Newhaven	+0 39	Dover
.....	+3 3	Brest	Newport	+0 16	Weston-s.-Mare
.....	+0 13	Dover	Nieuport	+1 6	Dover
.....	+0 22	Devonport	Nore	-1 28	London
g Road ..	+0 19	Weston-s.-Mare	Orfordness	-2 43	London
.....	-2 2	Brest	Oporto	-1 17	Brest
.....	-1 56	Liverpool	Ostende	+1 13	Dover
.....	+0 37	Dover	Padstow	-1 41	Weston-s.-Mare
.....	-0 23	Greenock	Peel, Isle of Man	-0 15	Liverpool
.....	+0 2	Weston-s.-Mare	Pembroke Dock	-0 42	Weston-s.-Mare
.....	-4 22	Liverpool	Penzance	-1 13	Devonport
ar	-0 10	Kingstown	Peterhead	-1 48	Leith
.....	-0 47	London	Piel harbour, Barrow ..	-0 18	Liverpool
.....	+4 2	Brest	Plymouth breakwater ..	-0 6	Devonport
.....	-1 37	Londonderry	Poole	-2 2	Dover
.....	-0 23	N. Shields	Port Carlisle	+0 47	Liverpool
wer	-0 10	Brest	Portland breakwater ..	+1 16	Devonport
.....	-0 27	Dover	Port Patrick	-0 58	Greenock
.....	+4 41	Greenock	Portsmouth	+0 29	Dover
.....	-2 21	Leith	Ramsgate	-2 19	London
.....	+0 33	Devonport	Rotterdam	+4 33	Dover
s	+0 3	Dover	Santander	-0 17	Brest
.....	+7 19	Brest	Scarborough	+0 48	N. Shields
.....	+0 3	Kingstown	Selsea bill	+0 33	Dover
our	+0 17	Queenstown	Sheerness	-1 21	London
ansay	-0 11	Liverpool	Shoreham	+0 23	Dover
.....	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
.....	-0 16	Kingstown	Southampton	-0 42	Dover
.....	-0 27	Dover	Spurn point	-1 3	Hull
.....	+0 56	Dover	St. Ives	-2 10	Weston-s.-Mare
.....	+0 38	Devonport	St. Malo	+2 18	Brest
.....	-0 46	Devonport	St. Mary (Scilly)	-1 16	Devonport
.....	+6 57	Brest	St. Nazaire	-0 7	Brest
.....	-0 47	Brest	Stornoway	+6 38	Greenock
head ..	-1 59	Hull	Stromness (Orkneys) ..	-5 17	Leith
.....	-0 12	Liverpool	Sunderland	-0 1	N. Shields
.....	-0 5	Dover *	Swansea bay	-0 53	Weston-s.-Mare
.....	-0 29	Devonport	Tay bar	-0 11	Leith
.....	+1 42	Dover	Tees bar	+0 22	N. Shields
.....	-0 26	Queenstown	Tenby	-1 12	Weston-s.-Mare
.....	-1 27	Brest	Thurso	-5 49	Leith
t)	+0 10	Greenock	Torbay	+0 17	Devonport
.....	+2 51	Weston-s.-Mare	Tralee bay	-0 58	Queenstown
.....	+2 26	Brest	Ushant (Ouessant)	-0 15	Brest
.....	-0 48	London	Valentia harbour	-1 19	Queenstown
at)	-0 53	Hull	Waterford	+0 19	Queenstown
. Peter) ..	+2 50	Brest	Westport	-0 4	Queenstown
.....	+0 5	N. Shields	Wexford	+2 20	Queenstown
.....	-1 52	London	Whitby	+0 22	N. Shields
.....	+6 4	Brest	Whitehaven	-0 9	Liverpool
.....	+0 21	Dover	Wick	-2 55	Leith
.....	-1 12	Liverpool	Wicklow	-0 41	Kingstown
harbour ..	-0 53	N. Shields	Workington	-0 19	Liverpool
.....	+5 42	Brest	Yarmouth road	-4 43	London
.....	-1 59	Leith	Youghall	+0 13	Queenstown

and other submerged surfaces to prevent fouling, and for preserving iron and wood and other submerged surfaces." (A communication.)

3759. Arthur Morris Crosby, U.S.A. "Improvements in ships' berths, which invention comprises mechanism for keeping the same level and for similar purposes." (A communication.)

3767. John Henry Fox, Farnborough, Kent. "A new and improved steam-engine for pumping, propelling ships, or other purposes."

3775. William Miller, Boston, Suffolk, Massachusetts, U.S.A. "Improvements in self-levelling berths." (A communication.) (Complete specification.)

3851. Stephen Pettit, Windsor. "Improved means for detaching or disengaging ship's boats."

3939. Albert Shaw, Lockwood near Huddersfield. "An improved arrangement of worm gearing applicable for driving, washing, and wringing machines, cranes, windlasses, steamship gearing, lifting jacks, and other machines."

3941. Georg Wilhelm Claussen, Bremerhaven, Germany. "Improvements in and relating to the propelling and steering of screw steamers." (A communication.)

3952. George Barton Berrell, Pennsylvania, U.S.A. "Improvements in lifeboats." (A communication.)

AMERICAN.

245316. Samuel Richards, Philadelphia, Pa. "An ice-boat and breaker."

245363. John Ericsson, New York. "A submarine gun."

245364. John Ericsson, New York. "Means for adapting submarine guns to ships."

245386. Alfred Krupp, Essen, Germany. "Mounting ordnance on ships."

245418. David Urech, Portsmouth. "A marine velocipede."

245469. John Ericsson, New York. "A steering apparatus."

245784. Harvey K. Carter, Camden, N.J. "A construction of vessels."

245785. Henry Casbolt, San Francisco. "A grive operating device for cable ways."

245803. John Ericsson, New York. "A firing pin for projectile torpedoes."

245804. John Ericsson, New York. "A marine torpedo."

245864. George H. Reynolds, New York. "A submarine torpedo boat."

245984. David Urch, Portsmouth. "An Anchor."

246134. Thomas B. Heathorn, London, England. "A steering apparatus."

246415. George H. Reynolds, New York. "A torpedo boat."

246546. A. F. Parker, Middleton Conn. "A centre board vessels."

AUSTRO HUNGARIAN.

A Lafargue, Kensington (England). "Improvements in hydraulic steering apparatus partly applicable to other purposes."

A. E. Müller, Vienna. "A cylindrical propeller for vessels in general."

H. Hirsch, London. "A construction of hulls, propellers, rudders, and other bodies working in water or propelled by water."

322. January 25, 1881. Price 6d. Charles Cullen. "Improvements in ships or vessels." This invention consists in constructing the decks of vessels hollow, so as to form air-tight compartments and providing the hatchways with covers, whereby the water is prevented from rising above any deck in the event of damage to the lower part of the vessel, and so utilising other parts of the vessel to form air-tight compartments. This invention also applies to river passenger steamers and other light vessels.

586. February 10, 1881. Price 6d. George Daniel Davis Stepney. "Improvements in apparatus or gear for steering vessels by hand or steam-power." In this invention the connection of the sheaves and worm-wheel depend upon a coupling or friction plates, so that a screw passing through the axle shall compress the sheaves and worm-wheel together, whereby the action is to be used or release them, that the sheaves revolve separately from the worm, the worm-wheel and steering-wheel. The second part of the invention relates to the operation of the steam-valve in steering gear operated by steam which is put in motion by the steering-wheel itself.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	PLACE.	SUBJECT.
336	ENGLAND—South Coast—Dungeness and South Sand Head	Alteration in fog-signals.
337	" West Coast—St. Ives	Discontinuance of harbour lights.
338	" East Coast—Yarmouth District	Alteration of buoyage.
339	SCOTLAND—East Coast—Montroseness Lighthouse	Alteration in light.
340	" Orkneys—Ruff Reef	New beacon.
341	NORTH SEA—Zuider Zee—Enkhuizen and Ven	Wierdijk light discontinued; red sector in Ven light.
342	" Ems River—Riff Gat	New automatic signal buoy.
343	BALTIC ENTRANCE—Sound—Mollelei and Barsebak	New harbour lights.
344	BALTIC—Femern Island—Markelsdorf	New light in October.
345	" Prussia—Stettin—Kricks Bank	Lighthouse removed, beacon re-placed.
346	" Oxdjupel Channel	Lights from buoys in place of leading lights.
347	BOTHNIA GULF—Åland Islands—Bogskar	Intended light postponed until 1882.
348	" Westra Finngrund	Particulars of new light-vessel.
349	" Sydosbrotten Light-Vessel	Replaced, with altered fog-signal.
350	NORWAY—West Coast—Trondhjem Fiord—Rodberg	New light.
351	FRANCE—West Coast—Saints—Armen Rock	Particulars of new light; proposed fog-signal.
352	SPAIN—West Coast—Vigo Bay—Cies Island	Light now regular in action.
353	" South Coast—Cadiz Bay—Las Puercas Shoal	Temporary light.
354	MEDITERRANEAN—Gibraltar	Sector of white light on new mole.
355	" Spain—Port Agullas	New lights on breakwater.
356	" Adriatic—Dalmatia—Brazza Island—Postire	New harbour light.
357	" Adriatic—Gulf of Venice—Port Pola	Closed channel re-opened.
358	AFRICA—East Coast—Inhambane River Bar	Particulars of change.
359	BAY OF BENGAL—Ceylon—East Coast—Batticaloa	Reported reef.
360	EASTERN ARCHIPELAGO—Sumatra—Pulo Pandang and Pulo Buru	New lights.
361	" Java—Probolingo and Sourabaya	New lights.
362	CHINA—East Coast—Lam-yit Island	Reef in south bay.
363	AUSTRALIA—East Coast—Baranjo Head	Alteration in light.
364	NEW ZEALAND—North Island—Cape Egmont	New light.
365	" " Port Napier	Alteration in light.
366	SOUTH AMERICA—Brazil—Rio San Francisco	Light to be removed owing to decay of tower.
367	WEST INDIES—British Guiana—Demerara River	Light-vessel altered in position.
368	" Venezuela—El Puerto—Buen Ayre Island	New harbour lights.
369	" New Providence—Nassau Harbour—Hog Island	Lantern defective.
370	UNITED STATES—New York—New York Bay	Lighted buoy at entrance.
371	ST. LAWRENCE GULF—Cape Breton Island—Louisburg Harbour	Depth on shoal, and new automatic signal buoy.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

336.—ENGLAND.—*South Coast.*—(1.) *Dungeness Lighthouse.*—*Intended Alteration in the Character of Fog-Signal.*—It is intended at an early date, probably the latter end of November, to make the following alteration in the character of the fog-signal. The signal will give two blasts in quick succession every two minutes, in the following manner, viz., the first blast a high note, the second a low note.

(2.) *South Sand Head Light-vessel.*—*Intended Alteration in the Character of Fog-Signal.*—At an early date, probably the latter end of November, it is intended to make the following alteration in the character of the fog-signal. The signal will give three blasts in quick succession every two minutes in the following manner, viz., the first blast a low note, the second a high note and the third a low note. Farther notice will be given.

337.—ENGLAND.—*West Coast.*—*St. Ives.*—*Discontinuance of Harbour Lights.*—The red light on the outer (ruined) pier; also the harbour tidal white light on the inner (old) pier head (previously shown from 1st September to 30th April), have been discontinued.

338.—ENGLAND.—*East Coast.*—*Alteration of the Buoyage in the Yarmouth District.*—The following alterations will shortly be made:—

(1.) *Stanford Channel.*—The East Newcome buoy will be moved S.W. $\frac{1}{2}$ W. $2\frac{3}{4}$ cables.

(2.) *Hewett Channel.*—The Scroby South Hook buoy will be discontinued. The South Scroby buoy will be moved N. $\frac{1}{4}$ W. 4 cables. The South-east and North-west Corton buoys will be altered to can buoys, as in 1878. The North Scroby buoy will be moved N.N.E. $1\frac{1}{2}$ cable.

(3.) *Corton Gateway.*—The Cockle Knoll buoy will be discontinued.

(4.) *Haisbro' Sand*.—The South Haisbro' buoy will be moved E. by E. $\frac{1}{2}$ mile.

(5.) *The Wash*.—The Woolpack buoy will be moved about W. by W. 2 cables. Further notice will be issued when the alterations are effected.

339.—SCOTLAND.—*East Coast*.—*Montroseness Lighthouse*.—*Alteration of Light*.—On the 4th of October, 1881, the fixed white light hitherto exhibited at Montroseness lighthouse will be changed to an *occulting white light*. The periods of light will be 'four seconds' duration, and will be separated by dark intervals about eight seconds and two seconds alternately.

340.—SCOTLAND.—*Orkneys*.—*Beacon on Ruff Reef, off Cantick Head Lighthouse, South Walls*.—A cast iron beacon has recently been erected on Ruff reef. It is coloured *red*, and consists of an open framework of iron, surmounted by a cylindrical cage, and is all about 34 feet in height above high water ordinary spring tides.

341.—NORTH SEA.—*Zuider Zee*.—*Enkhuizen*.—*Discontinuance of Wierdijk Light; Ven*.—*Sector of Red Light*.—The light shown from the north-east point of the Wierdijk, near Enkhuizen, has been discontinued. Also, a sector of *red* light is now shown from Ven or Geldershen lighthouse, visible from the southward between the bearings of N. by E. $\frac{1}{4}$ E. and N. $\frac{3}{4}$ W.—indicating the Hope of Kooizand, and the northward head of the westerly channel of the Krabbersgat. *Variation*, $15\frac{1}{2}^{\circ}$ W.

342.—NORTH SEA.—*Ems River*.—*Automatic Signal Buoy in Riff Gat*.—Placed at the entrance of the Riff gat, Ems river; and moored in 8 fathoms water, with the following bearings, viz.:—Borkum lighthouse, S.E. $\frac{1}{4}$ E.; Buoy (staff and vane) off entrance of Western Ems, W. by S. $\frac{1}{4}$ S. *Variation*, 15° W.

343.—BALTIC ENTRANCE.—*The Sound*.—*Sweden*.—(1.) *Harbour Light at Möllelei*.—A harbour light is now exhibited from a lighthouse on the outer mole head at the fishing station of Möllelei (Mölle); it is a *fixed white light*, elevated 15 feet above the sea, and visible from a distance of 5 or 6 miles. A sector of *red* light is shown between the bearings of S. 32° E. and S. 66° E., leading into the harbour. The lighthouse, hexagonal in shape,

is painted white. Position, lat. $56^{\circ} 16' 50''$ N., long. $12^{\circ} 29' 45''$ E. Variation, $11\frac{1}{2}^{\circ}$ W.

Note.—This light was exhibited on 20th July, and will continue to be shown until the harbour is blocked by ice.

(2.) *Harbour Light at Barsebak.*—A harbour light is now exhibited from a lighthouse on the south mole head at the fishing station of Barsebak (Barsebäck); it is a *fixed* light, showing red between the bearings of N. 45° E. and N. 77° E. (over Kulors reef), also between south and S. 29° E. (over the Wal-grund), and *white* in other directions. It is elevated 15 feet above the sea and visible from a distance of 5 miles. The lighthouse, hexagonal in shape, is painted white. Position, lat. $55^{\circ} 45' 30''$ N., long. $12^{\circ} 54' 40''$ E. Variation, $10\frac{1}{4}^{\circ}$ W.

Note.—Will continue to be shown as long as navigation is open.

344.—BALTIC.—*Femern Island.*—*Intended Light near West Markelsdorf.*—During October, 1881, a new light will be exhibited from a lighthouse erected near West Markelsdorf, north-west side of Femern island; it will be visible through an arc of 270° elevated 36 feet above the sea (34 above the ground) and should be seen from a distance of about 10 miles. The lighthouse octagonal in shape, and 39 feet high, is, with keepers dwelling (adjoining) built of red bricks; it is situated about three-quarters of a mile southward of Markelsdorf point, and immediately behind the sea wall, which is 9 feet above the sea, so that the lower part of the building is not seen from seaward. Position, lat. $54^{\circ} 31' 35''$ N., long. $11^{\circ} 4' 5''$ E. Further notice will be given.

345.—BALTIC.—*Prussia.*—*Approach to Stettin.*—*Krick's Bank Light-Vessel.*—*Replaced by Beacon, Intended Position.*—Krick's bank light-vessel (between Swinemünde and Stettin) has been replaced by a large floating beacon; and it is intended shortly to station this light-vessel off the entrance to the Kaiserfahrt.

346.—BALTIC.—*Oxdjupel Channel.*—*Discontinuance of Leading Lights, Lights Shown from Buoys.*—The two leading lights on the shore of Oxdjupel channel (between Wärmdö Landet and Rindö islets and leading past Frederiksborg) have been discontinued; and in lieu thereof, two fixed white lights, elevated 5 feet above the sea

are exhibited from two buoys placed in the fairway. Position approximate, lat. $59^{\circ} 23' 30''$ N., long. $18^{\circ} 27' 0''$ E.

347.—GULF OF BOTHNIA.—*Aland Islands.*—*Intended Light on Bogskär.*—With reference to previous notice the lighthouse on the western Bogskär rock, southern approach to Aland islands will not be completed during the year 1881, and the light will probably be exhibited in the autumn of 1882. It will be a *flashing white light*, showing *four flashes* in quick succession, each flash being visible for *fifteen seconds*—not a fixed and flashing light as originally proposed. Position, lat. $59^{\circ} 31' 15''$ N., long. $20^{\circ} 25' 40''$ E.

348.—GULF OF BOTHNIA.—*Light-Vessel on Westra Finngrund.* With reference to Notice, p. 733, a light-vessel has been placed on the south-western edge of Westra Finngrund (Finngrundet) bank; it shows a *fixed red light* (temporary, to be replaced by one of more power), visible from a distance of 5 miles. The light-vessel is painted red, and has the words *Westra Banken* in white letters on her sides. Position approximate, lat. $60^{\circ} 54'$ N., long. $17^{\circ} 56'$ E.

349.—GULF OF BOTHNIA.—*Sydosbrötten Light-Vessel Replaced in Position, Alteration in Fog-Signal.*—Sydosbrötten (Sydost Brottet) light-vessel has been replaced in position, and the following alteration has been made in the fog-signal. The signal is a steam horn, which during thick or foggy weather will be sounded *three times* at intervals of *twenty-five seconds*—the first two signals have a duration of *five or six seconds*, and the last of *two seconds only*.

350.—NORWAY.—*West Coast.*—*Trondhjem Fiord.*—*Leading Light at Rödberg.*—Exhibited from the post-house on the summit of Rödberg (Rödbjerg), northern side of Trondhjem fiord; it is a *fixed light*, elevated 29 feet above the sea, and visible throughout the channel, from a distance of 4 miles. Position as given, lat. $63^{\circ} 29' 15''$ N., long. $9^{\circ} 59' 45''$ E.—approximate on Admiralty chart, lat. $63^{\circ} 29' 45''$ N., long. $10^{\circ} 4' 0''$ E. Exhibited annually from 1st of August to 15th of May.

351.—FRANCE.—*West Coast.*—*Chaussée de Sein (or the Saints.)*—*Light on Ar-Men Rock.*—With reference to previous notice on the intended exhibition of a light from a lighthouse constructed of masonry and recently erected on Ar-men rock, $3\frac{1}{2}$ miles from the

357.—MEDITERRANEAN.—*Adriatic.—Gulf of Venice.—Port Pola.—Channel Open between St. Andrea and St. Caterina Islets.*—With reference to Notice, p. 648, on the channel between St. Andrea and St. Caterina islets, at the entrance of port Pola, being closed by the anchorage of a vessel for experimental purposes; the mining experiments near Monte Grosso being concluded, the vessel has been withdrawn, and the channel re-opened.

358.—AFRICA.—*East Coast.—Inhambane River Bar.*—The bar, nearly four miles from the shore, appears to have shifted southward of its former position. On bringing the entrance to bear W.S.W., a white mark, locally known as the Pedestal, and resembling the front of a chapel, will be seen on the beach on Inalinga peninsula, and beyond it on the summit of the hill are two isolated trees (the southern being the most remarkable) with a small white pillar between them, which shows clearly in the morning. The Pedestal just open southward of the southernmost tree leads to the bar in the deepest water—on shoaling the water on the bar, bring the Pedestal about two points on the port-bow, keeping it so until well open of the southern isolated tree, and nearly in line with a small double tree; then steer towards the Pedestal, with the marks in that position, which lead clear of the shoals on the south side of the channel. Vessels should keep well outside the bar until the leading marks are brought on, as the water shoals quickly; and should on no account proceed above the anchorage off the Pedestal without a pilot, on account of the numerous sandbanks between it and the town of Inhambane. *Variation, 21½° W.*

359.—BAY OF BENGAL.—*Ceylon.—East Coast.—Reported Reef off Batticaloa.*—The s.s. *Brennus*, drawing 22 feet of water, struck on what is supposed to be a coral reef off Batticaloa (east coast, Ceylon), and had to be beached to save her from sinking. The reef is about 4 miles off shore and bears from Batticaloa flag-staff about N.E. by E. $\frac{1}{2}$ E.; and mariners are cautioned to give that part of the coast a wide berth.

Note.—It is very probable that this reef is not so far off shore as reported.

360.—EASTERN ARCHIPELAGO.—*Sumatra.—(1.) West Coast.*—

circular in shape, 150 yards long by 100 yards broad. It lies with the following mark and bearings, viz.:—The small rock north-eastward of Loutz rock in line with north extreme of Loutz rock, W. by S. $\frac{3}{4}$ S.; Low cone, Lam-yit island, N. $\frac{3}{4}$ W.; south extreme of south Yit, S.E. by E. $\frac{1}{4}$ E. Position, lat, $25^{\circ} 10' 5''$ N., long. $119^{\circ} 29' 40''$ E. South-eastward of Duke reef at the distance of half a cable, there is a depth of four fathoms, increasing gradually to $10\frac{1}{2}$ fathoms when one mile distant in that direction. Variation, $\frac{1}{2}^{\circ}$ W.

363.—AUSTRALIA.—*East Coast.*—*Alteration in Baranjo Head Light.*—On 1st August 1881, the two fixed white lights hitherto exhibited from Baranjo head, south side of entrance to Broken bay, would be discontinued, and a red light substituted for them. This light will be *fixed*, elevated 370 feet above high water, and visible from a distance of 15 miles, between the bearings of N.N.W. through west to S.W. $\frac{1}{2}$ S. Variation, $10\frac{1}{2}^{\circ}$ E.

364.—NEW ZEALAND.—*North Island.*—*West Coast.*—*Light on Cape Egmont.*—With reference to previous notice on the intended exhibition of a fixed light on cape Egmont, it would be shown on 1st August, 1881. The light is *fixed white* elevated 103 feet above the sea, and visible seaward from a distance of about 15 miles, between the bearings of N. 23° W. and S. 5° W. The light tower is situated 259 yards within the high water mark of cape Egmont, and is 67 feet high, constructed of iron, and painted white. Position approximate, lat. $39^{\circ} 17'$ S., long. $173^{\circ} 46'$ E. Variation, $14\frac{3}{4}^{\circ}$ E.

365.—NEW ZEALAND.—*North Island.*—*East Coast.*—*Alteration in Lights at Port Napier.*—On 18th July, 1881, a light would be exhibited from the eastern pier at port Napier, in place of the two fixed green lights and the fixed red and white light formerly exhibited at the entrance to that port, which have been discontinued. This light is *fixed*, elevated about 27 feet above the sea, and visible from a distance of about 7 miles; it shows *white* when bearing from S.W. $\frac{1}{2}$ W. to S.W. $\frac{1}{2}$ S.; *red* from S.W. $\frac{1}{2}$ S. to S.S.W. $\frac{3}{4}$ W. over Pania rock; *white* from S.S.W. $\frac{3}{4}$ W. to S. $\frac{3}{4}$ E.; *green* from S. $\frac{3}{4}$ E. to S.S.E. $\frac{1}{2}$ E. over the anchorage; and *white* westward of the anchorage. The light is exhibited from an open wooden structure,

painted black, and situated about 190 feet within the outer extremity of the eastern pier.

Note.—Vessels approaching port Napier from the southward should have the white sector of this light well open before rounding Ahuriri bluff, in order to avoid Auckland rock. *Variation*, $14\frac{3}{4}^{\circ}$ E.

366.—SOUTH AMERICA.—*Brazil.*—*Rio San Francisco.*—*Intend Discontinuance of Light.*—It is intended to remove the illuminating apparatus from the lighthouse near the north point of entrance to Rio San Francisco, in consequence of the building falling into decay.

367.—SOUTH AMERICA.—*British Guiana.*—*Demerara River Entrance.*—*Alteration in Position of Light-Vessel.*—Captain R. C. Kinahan, H.M.S. *Orontes*, reports that in July, 1881, the light-vessel at Demerara river entrance was lying in 14 feet at low water about 4 miles inshore of the position assigned her. Position approximate, lat. $6^{\circ} 56' 10''$ N., long. $58^{\circ} 7' 40''$ W.

368.—WEST INDIES.—*Venezuela.*—*Harbour Lights at El Puerto Buen Ayre Island.*—A light is now exhibited from a lighthouse erected on Orange battery, west side of Buen Ayre island, and fronting Buen Ayre islet. It is a *fixed white* light, visible seaward between the bearings of S. $2\frac{1}{2}^{\circ}$ E. and N. $2\frac{1}{2}^{\circ}$ W.; elevated 29 feet above the sea, and should be seen from a distance of 3 miles. The lighthouse is a small two-storeyed tower, square in shape and painted yellow. Position approximate, lat. $12^{\circ} 10'$ N., long. $68^{\circ} 19'$ W.

Note.—This light in line with a light shown from a standard 10 feet high, at the extremity of the landing stage, indicates the anchorage. *Variation*, $2\frac{1}{2}^{\circ}$ E.

369.—WEST INDIES.—*New Providence.*—*Nassau Harbour.*—*Hog Island Light.*—*Lantern Defective.*—In consequence of the lantern being defective, the light exhibited on the west end of Hog island, Nassau harbour, is, at the distance of about six miles totally obscured between the bearings of S. 30° E. and S. 34° E., also between S. 56° W. and S. 66° W., and the light is only dimly visible between the bearings of south and S. $1\frac{1}{2}^{\circ}$ E., also between S. 12° W. and S. 15° W. *Variation*, 2° E.

370.—UNITED STATES.—*New York.*—*New York Bay.*—*Buoy Lighted by Gas at Entrance.*—*Buoy lighted by gas (Pintsch system).*

and intended to show a continuous *white* light, has been placed at the south channel entrance to New York bay. The buoy, painted black and white in vertical stripes, is moored in seven fathoms water, about one-third of a mile from the wreck of the *Scotland* light-vessel, and near the south channel entrance buoy.

Note.—As this buoy is for experimental purposes only, due notice will be given of its removal.

371.—GULF OF ST. LAWRENCE.—*Cape Breton Island.*—*Louisburg Harbour.*—*Depth on Harbour Shoal, and Automatic Signal Buoy.*—A depth of 21 feet (with a possible 19 feet) has been found on Harbour shoal, in the fairway of the entrance to Louisburg harbour, south-eastern side of Cape Breton island. Also an *Automatic signal buoy* has been placed in the approach to Louisburg, in a S.E. by E. direction from the fairway into the harbour, and with the lighthouse distant $1\frac{1}{2}$ mile.

Note.—The railway pier in Louisburg harbour curves from the shore in a north-easterly direction, and has from 27 to 33 feet on its western side. *Variation*, $25\frac{1}{2}^{\circ}$ W.

CHARTS, &C., PUBLISHED BY THE HYDROGRAPHIC DEPARTMENT,
ADMIRALTY, IN JULY AND AUGUST, 1881.

No.		s.	d.
2696	England, Isle of Man :—Douglas bay ...	1	6
25	Australia, south coast :—Backstairs passage ...	1	6
3655	Japan :—Simoda harbour ...	1	6
200	Adriatic sea :—Ortona to the river Po, including the entrance of the gulf of Quarnero, on the Austrian Coast. (Plans, Ortona. Port Fano. Port Pesaro. Rimini. Port Corsini.) ...	2	6
228	Black sea, Krimea :—Belbek river to cape Kher-sonese, including Sevastopol harbour ...	1	0
889	South America, east coast :—Touro to Formosa ...	2	0
280	Newfoundland, east coast :—Notre Dame bay. (Plans, Paquet harbour. La Scie harbour. Approaches to Nippers harbour.) ...	2	6

552	South America, east coast:—Egg harbour or port San Antonio, with Gill bay and The Oven. Tova island anchorages
2160	China sea:—Carimata strait
876	China sea:—Hainan strait
1418	England, west coast:—Holyhead bay
2011	England, west coast:—Holyhead harbour... ..
1963	Plan added. Owick bay.
1962	Plan added. Goat island anchorage.
1999	Plan added. Lyttelton harbour.
1802	Plan added. Entrance to the Kourou river.
1760	Plan added. Tingtae anchorage.
183	Plan added. Assizes harbour.

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE
HYDROGRAPHIC OFFICE, ADMIRALTY, 1881.

- No. 21.—EASTERN ARCHIPELAGO. Relating chiefly to the or Mindoro sea, the north-east coast of Borneo, north coast of Java.
- No. 22.—EASTERN ARCHIPELAGO. Relating to the north coast of Borneo.
- No. 23.—DIRECTIONS FOR COAST OF IRELAND, part I. Relating to the south and east coasts of Ireland.
- No. 24.—DIRECTIONS FOR WEST COAST OF ENGLAND.—Additions and corrections to sailing directions for west coast of England.
- No. 25.—DIRECTIONS FOR COAST OF IRELAND, part I. Relating to Dundalk bay.
- No. 26.—CHINA SEA DIRECTORY, vol. 3. Relating principally to ports on the east coast of China.
- No. 27.—AUSTRALIA DIRECTORY, vol. 2. Revised sailing directions for that portion of the east coast of Australia between the western entrance to Broad sound and Pioneer river, together with the adjacent off-shore islands.

- No. 28.—AUSTRALIA DIRECTORY, vol. 2. Relating to the south-east coast of New Guinea, and to the Louisiade archipelago.
- No. 29.—CHINA SEA DIRECTORY, vol. 2. Information relating to Natuna islands.
- No. 30.—CHINA SEA DIRECTORY, vol. 2. Information relating to Hainan strait.

BOOKS.

s. d.

- The St. Lawrence Pilot, vol. 2, comprising sailing directions for the gulf and river. Fifth edition, 1881. ... 3 6
- Admiralty catalogue of charts, plans, and sailing directions 1 0

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No.

1199. China :—Hieshan islands to the Yang-tse-Kiang.
2695. China, Yang-tse-Kiang :—Tung-liu to Hankau.
1237. Ireland, east coast :—Lough Larne.
2678. China, Yang-tse-Kiang :—Nanking to Tung-liu.
2691. Pacific ocean :—Fiji islands.
375. Labrador :—Sandwich bay to Nain.
933. Java, north coast :—Batavia road.
84. Bay of Bengal :—Chittagong or Kornafoolee river.
2137. Eastern archipelago :—Gaspar strait.
428. West Indies, Cuba :—Cabonico and Livisa.
486. West Indies :—Jamaica and Pedro bank.
2249. Mediterranean, Malta :—Valetta to Marsa Scirocco.
811. China :—Anchorages between Black head and Crab point.
40. India, west coast :—Karachi harbour.
89. Portugal :—Tagus river entrance.
1853. South America, west coast :—Callao.
2118. Arctic sea discoveries.

OUR OFFICIAL LOG.

OFFICIAL INQUIRIES AT HOME.

1072 *Acorn* and *William Hartmann*, s.s.; in collision with *Staithe*, March 26, 1881. This case was originally heard at Cardiff, before Jones, Stipendiary Magistrate, and reheard August 11, 1881, before Rothery, Wreck Commissioner; Castle and Hyde, N.A. Collision caused by *Acorn* not showing a light over the stern; and also from mate of *William Hartmann* not keeping a proper look-out, but as the *Acorn* was not seriously damaged certificate of mate of *William Hartmann* was returned to him.

1073. *Lady Maxwell*, s.s.; built in Ireland, 1874; owned by Mr. P. McGuffie; tonnage, 268; Liverpool to Workington; coals and ballast; stranded July 1, 1881. Inquiry held at Liverpool August 11, 1881, before Mansfield, Judge; Parfitt and Anderson, N.A. Master in default for steering an unsafe and improper course. Certificate suspended for six months.

1074. *Royal Charley*, ship; built at Meteghan, Nova Scotia, 1866; owned by Mr. A. Durkey; tonnage, 986; Havre to New Orleans; ballast; stranded on the Island of Cuba, May 12, 1881. Inquiry held at Liverpool, August 13, 1881, before Mansfield, Judge Parfitt and Anderson, N.A. Second mate to blame for neglecting to keep a proper look-out. Certificate suspended for twelve months.

1077. *Acacia*, barque; built at Newcastle-on-Tyne, 1868; owned by Mr. C. Hodgson; tonnage, 391; Cochin to London; coconut oil and fibre; stranded in Zanzibar Channel, December 30, 1880. Inquiry held at Sunderland, August 17, 1881, before Kay and Wilson, Judges; Ward and Harland, N.A. The rock on which the vessel stranded does not appear to be accurately marked on the Admiralty chart. Master exonerated from blame.

1078. *Asterope*, brig; built at St. Peter's, Prince Edward Island, 1865; owned by Mr. R. Sherris and others, of Falmouth; tonnage, 261; Cardiff to Para; coals; lost on Resolution Reef, coast of Brazil, July 7, 1881. Inquiry held at Westminster August 17, 1881, before Rothery, Wreck Commissioner; Ronaldson and Vaux, N.A. Loss caused by master being unaware of the rock, it not being laid down on the chart by which he was navigating.

1082. *Henry Palmer*, barquentine; built in America; owned by Mr H. Palmer; tonnage, 288; Quebec to United Kingdom; timber: supposed to have foundered at sea. Inquiry held at Liverpool, August 26, 1881, before Mansfield, Judge; Comyn and Parish, N.A. No evidence before the Court to show how or where the vessel was lost.

1084. *Alicia*, schooner, and *Bucentaur*, s.s.; the former built at Aberayron, 1862; owned partly by master; tonnage, 96; river Thames to Limerick; cement; the latter built at Jarrow, 1875; owned by Mr J. Hall; tonnage, 1,176; London to Cardiff; water ballast; in collision off the Lizard, May 6, 1881, when loss of life ensued. Inquiry held at Bristol, August 25, 1881, before Nash and Lysaght, Justices; Burney, Curling, and Kennedy, N.A. Casualty due to the *Bucentaur* (she being an overtaking vessel) failing to keep out of the way of the schooner, contrary to the Regulations for Preventing Collisions at Sea. Chief mate in default. Certificate suspended for twelve months.

OFFICIAL INQUIRIES ABROAD.

1075. *Carl Ludwig*, brig; lost near Yengchow, February 23, 1881. Inquiry held at Chefoo. Master guilty of an error of judgment.

1076. *Lorne*, s.s.; stranded in the River Han, May 3, 1881. Inquiry held at Hong Kong, May 14, 1881. Master cautioned to be more careful in future.

1079. *Liburnian*, ship; capsized in Galle Harbour, June 28, 1881. Inquiry held at Galle, July 7, 1881. Master to blame for not sufficiently ballasting the vessel. Certificate suspended for twelve months.

1080. *Elgin*, s.s.; lost on Bombay Shoal, China Sea, May 23, 1881. Inquiry held at Singapore, June 21, 1881. Master reprimanded for persevering on a course which would take the vessel into the centre of a cyclone.

1081. *Kembla*, s.s., and *Perseverance*; in collision near Newcastle, N.S.W., June 14, 1881. Inquiry held at Newcastle, June 29, 1881. Master of *Kembla* to blame.

1083. *Amy Robsart*, brigantine; stranded at the River De May 23, 1881. Inquiry held at Torquay, Tasmania, June 2 1881. Master to blame for having insufficient ballast on board and for being short handed. Certificate suspended for six months.

1085. *Mayflower*, brig; lost at Flinders Bay, July 14, 1880. Inquiry held at Vasse, Western Australia, July 28, 1880. Master in default for anchoring his vessel in a dangerous position. Certificate suspended for six months.

1086. *Penguin*, schooner; stranded in Queen Charlotte Sound March 25, 1881. Inquiry held at Wellington, N.Z., March 2 1881. Accident due to an error of judgment on the part of the chief officer. Master censured for leaving him in charge.

1087. *Policeman*, schooner; foundered off Ahipara, N.Z. May 24, 1881. Inquiry held at Auckland, June 15, 1881. No blame attached to master.

1088. *Tararua*, s.s.; Lost on Waipapa Point, April 29, 1880 when about 180 persons lost their lives. Inquiry held at Dunedin June 3, 1881. Accident due to neglect of the lead and an improper look-out being kept. Master drowned.

1089. *Zara*, schooner; beached in Mossel Bay. Inquiry held there, July 28, 1881. Master exonerated from blame.

1090. *Brennus*, s.s.; lost on an unknown rock near Batticaloa Light, Ceylon, July 7, 1881. Inquiry held at Galle, July 2 1881. No blame attached to master.

1091. *Strickland*; lost in the Port of Maceio, July 27, 1880. Inquiry held at Pernambuco, August 2, 1881. Casualty due to the cables parting.

1092. *Bronzewing*, s.s.; suffered injury to boiler, May 3 1881. Inquiry held at Brisbane, June 21, 1881. Engineer to blame. Certificate suspended for six months.

1093. *Lady Bowen*, s.s.; stranded in Hamilton Reach, Brisbane River, May 6, 1881. Inquiry held at Brisbane, May 1 1881. Accident caused by an assistant pilot taking the wheel from the quartermaster in the absence of the master.

1094. *Lady Darling*, schooner; lost on Mallicolo Island, New Hebrides, March 7, 1881. Inquiry held at Brisbane, April 1 1881. Master and mate cautioned to be more careful in future.

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DISPLACEMENT *VERSUS* REGISTER TONNAGE.

IN our last number we extracted that part of the Report of the Royal Commission on Tonnage containing the conclusions arrived at, and the recommendations made as to alterations in the existing laws.

The opinion of the majority of the Royal Commissioners on the subject may be summarised:—

1.—The system of measurement of ships for obtaining gross tonnage is good, and only requires some alteration in a few points of detail.

2.—Allowances to steamers in respect of their propelling power are desirable, but the present way of estimating them is very objectionable, and the allowances are generally too much.

Three of the Commissioners dissent from the conclusions of their colleagues; two, Mr. Rothery and Mr. Waymouth, think that the present law is altogether wrong in principle and is productive of much evil; they each propose a distinct system and differ nearly as much from each other as from the report of the majority. Mr. Glover, the third dissentient, agrees for the most part with the report as regards gross tonnage, but in respect of allowances thinks that the present system is a good one and does not require alteration.

tonnage. The 100 cubic feet to the register ton was determined by one consideration only, to obtain an average result equal to that got by the old rule of Builders' Tonnage. Builders' Tonnage was a very rough rule, depending upon length and breadth only, and in 1845 a law had been passed by which a method of measurement was established, based on the same principle as the present, but not sufficiently accurate to answer its purpose. Results obtained by it showed an increase over the old rule of about seven per cent., and this was one of many serious defects in it. In 1854 it was considered desirable to fix a divisor which would give the same unit ton as Builders' Measurement; this number was found to be about 100. The tonnage unit is thus seen to be much older than the present rule of tonnage; whether that rule be sound or not in principle, the register ton has for the shipowner a definite meaning and use, and no rule will please him which does not retain this unit.

The method of measurement of the present tonnage is not called in question very much; on the whole it is generally acknowledged to be fairly accurate and to need but some small alterations in detail. The principle charges made against the present law, are that by its operation the type of vessel known as a "well-deck" steamer is encouraged, and that it acts unfairly against water-ballast. The "well-deck" ship usually has a topgallant-forecastle and a bridge-house covering the engines and boilers, abaft which there is usually a long break or a break and then a poop, but sometimes a second "well" and a poop aft. It is said that if instead of there being a space or spaces on the deck not covered in, and having close bulwarks at the ship's side, the vessel had an awning-deck extending all fore-and-aft she would be much safer. Owners of such ships it has been said would cover in the "wells," if it were not the case that by the present law their register tonnage would be much increased; and thus there is a penalty attached to an arrangement which would not be a source of gain to the owners, but would simply make the ship a safer one. It might be urged with equal force on the owner that if a flush-deck with open bulwarks is so great a desideratum, why not take off the existing deck erections and remove the close bulwarks. Of

long, and so low as to leave but a small quantity of water with no means of discharge except the very small outlet provided by the scuppers. Above all, the wash-ports should be accessible. They of course cannot always be left open, if they were they would soon be carried away, but they should be so arranged that when required they can be readily unfastened. This obviously cannot be done when vessels have deck cargoes of cattle whose pens occupy all the ship's side next the bulwarks, regardless of wash-ports or anything else. Probably the "well-deck" ship furnishes the most economical means of assuring safety for a ship of moderate size exclusively used for cargo carrying. The extreme ends of the vessel require to be high and in her case this feature is seen in the topgallant-forecastle and poop, the necessary openings above the engines and boilers require special protection; this is secured by the bridge-house, and specially strong hatches and high coamings protect the openings in the upper-deck. The fact that there are in existence awning-decked ships, full three-decked ships, and so-called "well-decked" ships, and a goodly number of each, proves, as the Commissioners appropriately remark, "that all these types of ships have their special uses and advantages, and if properly constructed, loaded and handled, are to all intents and purposes seaworthy ships." The Commissioners also remark that if the well-decked ship were covered in, the space gained would be used for cargo. This we would remark may be the case irrespective of the question of freeboard. At present, as is well known, awning-decked steamers are specially useful for the cotton trade, and for light cargoes they have very great advantages over vessels which merely have a poop, fore-castle, and bridge-house. The latter in some cases pay dues upon deck erections which they are not able to turn to much practical use, and it would be fairer to ask for such deck erections to be exempted from measurement, than to ask for a concession in favour of awning-decks. The well-decked ship referred to in the last remarks is that with two wells; it is a much less common type of vessel than those which have topgallant-forecastle, bridge-house amidships, and the whole after part of the vessel covered by a raised quarter-deck. The raised quarter-deck in the latter is always utilised for cargo. What we

of adding pounds to gallons and expressing the result in some unknown quantity.

The proposal to make the tonnage depend upon deadweight capacity finds an able advocate in Mr. B. Waymouth; the first scheme is, as we have said, supported by Mr. Rothery, and its authorship is attributed by him to Sir Digby Murray, the Nautical Adviser of the Board of Trade, who gave evidence in its favour before the Commission. As the evidence is not yet published we are not in a position to deal with Sir Digby Murray's reasons for his views on the subject, but it would appear by some correspondence in the *Times*, that the idea of using the roomage ton divisor was suggested by him. The applicability of displacement tonnage to the assessment of ships was discussed, as was indeed nearly every other system which has been proposed of late, by Mr. Moorsom, the founder of the existing system, in a book published about thirty years ago. A reference to that work will show that the only new thing in Mr. Rothery's suggestions is the employment of 100 as a divisor with a view of assimilating the results under the proposed, to those under the existing system.

Mr. Rothery's "reasons for not signing the report" occupy more space in the parliamentary paper than the Report of the Commissioners itself, and therefore may be taken to contain a pretty full statement of his case. They have, however, found advocates in an able if not well informed writer in the *Times*, and in some correspondents to that paper. A large portion of Mr. Rothery's "reasons" are merely criticisms of the defective state of the present law as regards the allowances from tonnage made to steamers, and as to the policy of making any such allowance at all; the former question we propose to deal with in a future article, but would remark *en passant* that most of the criticisms only apply to acknowledged defects in the existing law for which adequate remedies are recommended by the Commissioners. As to the policy of any allowance at all to steamers, much might be said on both sides; it must be remembered however that the existing arrangements in dock and harbour dues are based upon the present relation between the tonnage of steamers and sailing ships, and any marked disturbance of that relation

would necessitate an entire revision of the scale of charges. This would mean different rates for steamers as compared with sailing ships, all steamers being treated alike, to the manifest advantage of those with exceptionally low engine power.

Coming now to the chief reason adduced by Mr. Rothery, in condemnation of the existing system, and in support of displacement tonnage, it would appear that his main objection to the principle of register tonnage is that "it is an attempt to arrive at a rough and rude way at a vessel's earnings, taking, however, into account only one element of value, size, or space, and it appears to me that it would be as reasonable to say that all articles shall be taxed and indeed that all should be valued according to their size as to say that dues shall be levied on a vessel not in proportion to the space she occupies in the dock, but in proportion to the space which she has available for earning freight without regard to her earnings, to the trade in which she is engaged, or to the cargo which she carries." The displacement tonnage advocated by Mr. Rothery, would, however, he thinks, be based upon services rendered. To get at a measure of service rendered he first confines his consideration of service to dock, harbour, canal, and river accommodation, putting on one side as of comparative importance light dues, which, although as he says of comparatively small amount,* are strictly speaking the only *raison d'être* for a legal system of tonnage measurement. Dock dues, &c., which are merely local considerations, might be provided for by the private individuals who own the docks, or the local conservators of the harbour, &c., but imposts levied for the support of lights are necessarily a matter of national and not merely local concern. However supposing that dock and harbour dues are the main features of tonnage charges, we cannot see that a vessel's load displacement is in any sense a measure of the accommodation provided for her. Mr. Rothery holds that the space a ship occupies in the water, is a measure of the accommodation provided for her. We cannot conceive any two things which have less relation to each other than these. Surely the practical measure of the space occupied by a vessel is

* The average annual charge made in the United Kingdom upon shipping for light dues exceeds £400,000.

dock is the extent to which she prevents other vessels from occupying the same dock. This would depend upon the area of a horizontal section of the vessel at the level of the dock side. In fact, just that part of the ship which Mr. Rothery's tonnage leaves out is the very part of most importance in the consideration of the value of accommodation provided. The length of quay taken up and the breadth of the vessel are in this respect the important elements, and whether she be a square box under water, or have lines like those of a yacht does not concern the dock companies. Her depth also is something she should pay for, since depth is an element of cost in making a dock. What proportion of the expenses of dock making and dock keeping depends upon depth, and what upon horizontal area is however quite another, and we think mostly an unanswerable question. In some large ports such as Liverpool the expense of area is little, compared with that of draught, nothing having been paid for land except the expense of reclamation. On the other hand immense expenditure has been entered into, with a view of obtaining sufficient depth of water both on the sill of the docks, and also in the channels leading to them. In some ports, on the contrary, depth of water is secured with but little expense, but the cost of land on which docks are made is a very heavy charge. As regards maintenance of harbours, the two important elements of the ship involving cost to the harbour authority are the length and draught, usually the latter is the all important element, sometimes when the area of the harbour is restricted the importance of the former is much increased. In rivers and canals, again, breadth and depth are usually the occasions of cost to the water authority and should, on the principle of charging for accommodation provided, be the elements of taxation. Indeed as regards canal navigation, the fuller the lines of the vessel are, the less is the loss of water in passing her through a lock, and consequently the cost is in this respect in inverse ratio to the displacement, on the same principal dimensions. Canal navigation is, however, we think, outside the whole question of register tonnage.

It must further be remembered that the whole of the services rendered to vessels by dock companies and for which payment is made are not measured by the actual accommodation of quay

ourselves with quoting the opening sentence of his remarks upon register tonnage :—"Turning now to *register tonnage*, the legal measurement for British merchant ships since 1854, one finds a method resting upon a scientific basis not easily evaded by persons desirous of making the nominal tonnage of their ships small, and generally commending itself after more than twenty years' experience."

There is really nothing in the argument that a means of comparison useful as between war ships, is therefore useful as a measure for merchant ships provided they both have a fixed load-line. The fighting value of a war ship depends upon several factors, each of which, to a large extent, is measured by her load displacement or rather may have a certain part of her load displacement assigned to it. The protection afforded by armour, depending upon its thickness and extent, the weight of the armament, the speed as represented by the total weight of the machinery and boilers, the coal endurance, and other qualities are all more or less questions of weight, and the total weight of the vessel with coal on board is perhaps as useful a means of comparison as could be devised between war ships, observing that the thing to be compared in each case is the general value of the ship as a fighting ship. This general value is better expressed by her displacement tonnage than by anything else. The space she would occupy in a dock or harbour is altogether beside the question.

It may be mentioned that register tonnage never was used by the Admiralty as a means of comparison between war ships, the tonnage formerly inserted in the Navy List was the Builders' Tonnage, the old rule depending upon the length and breadth only. As a matter of fact all war vessels in this country are measured by the Board of Trade Surveyors, and their register tonnage ascertained, chiefly with a view to the payment of Suez Canal Tonnage Dues.

For all classes of steamers which use the Suez Canal the incidence of the Canal Dues is a most important consideration. An international commission after much debate came to what was believed to be a generally satisfactory conclusion on the basis of Moorsom tonnage. The method of measurement throughout, and

avoided by the present system. The tonnage under deck, and of most of the spaces on deck, is now taken from the ship's register, either in Suez Canal Tonnage, or in any system adopted by the conforming governments, the measurements, if any, required for the varying elements of the tonnage are but few in number, and can be taken when the vessel has all her cargo on board. It would indeed be better if the actual register tonnage were international, but the substantial advantages of a common system are even now virtually secured.

There is no such objection on the part of foreign countries to accept our system as Mr. Rothery appears to suppose all through his report; all the important maritime nations have accepted its essential features, and many of those which have adopted rules for allowances different from ours, have done so in the belief that our own Government was prepared to follow them in the alteration. Thus the rule of allowance used by Austro-Hungary, Germany, Italy, Norway, and Russia, is an English rule, the rule of the proposed Merchant Shipping Code of 1871.

Mr. Rothery attempts to deal with some of the objections of his scheme, of which two very forcible ones are, that it would lead to the building of light and flimsy ships, and that it would necessitate the re-registration of all British ships. On the first of these we quote his remarks:—

“It was said also that it would lead to the construction of light and flimsy ships, seeing that the lighter the ship, the more capacity there would be on the same displacement for cargo, but the same objection would apply to the present system; and I venture to think that it may very safely be left to the Insurance Companies and to the Officers of the Board of Trade to prevent unseaworthy vessels of this description from going to sea.”

Mr. Waymouth speaks for the society whose special object is to look after the interests of the insurance companies; let him answer on this point:—“It might influence the building of slight vessels, and slight engines and boilers, in order to contribute to the vessels being large weight carriers in proportion to their so-called tonnage.”

The objection that displacement tonnage of any kind would

involve remeasurement and re-registry of all existing vessels appears to be admitted by Mr. Waymouth. Mr. Rothery, however, thinks it is got over by merely stipulating that the new system should not be retrospective, and seems to think that there is no more necessity for its being so, than there is for making retrospective the action of the amendments in the law, proposed by the majority of the Commissioners. Those amendments would scarcely affect sailing vessels at all, and only certain classes of steamers, whereas Mr. Rothery's scheme would affect a large majority of steamers and all sailing ships. The way of getting over the difficulty is to adopt the divisor 100, which is used under the present law, and has under that law a definite meaning and purpose. Every one knows that the present register ton means 100 cubic feet of space, and that, to say that any vessel is 1,000 gross tonnage, means that she has a total of 100,000 cubic feet of space in her hold and in the enclosed erections on her deck. But to divide the load displacement as ascertained in cubic feet by 100 and call the result tons, is to still further complicate matters by the addition of a new and meaningless unit. A ton displacement means a ton weight of salt water which occupies 35 cubic feet, Mr. Rothery's ton, would be really nearly three times an actual ton weight. It is sought to justify the application of the space ton divisor 100 to a displacement tonnage by the consideration that it was stated in evidence that the calculated load displacement of a few large Atlantic steamers gave nearly the same figures when divided by 100 as their net register tonnage. The *Germanic* of the White Star Line has a net register tonnage of 3,150 and if her displacement be calculated to her maximum load-line and the result divided by 100, the result is 2,972. The same quantities in the *Egypt* (of the National Line), are respectively 2,959 and 3,006, and in the *Spain*, also a National, 2,875 and 2,902. These vessels are all large Atlantic passenger steamers with necessarily high freeboard, if the proposed system suits them it would act very much to the prejudice of cargo steamers of moderate size, a different, but in their way as useful a class of vessel, and when properly loaded, as safe with a much less proportion of freeboard. It comes to this:—White Star Liners of the future will be of much the

same tonnage as at present, but cargo steamers of the future will for the same size ship have much more tonnage than at present, and sailing ships of the future will be considerable gainers over corresponding vessels at present in existence. The retention of the roomage ton unit in the displacement system has then this quality attaching to it, that in a few large ships it leaves things as at present, while in the large mass it produces utter confusion and trouble.

The proposal advocated by Mr. B. Waymouth is, that the maximum capacity of a vessel for deadweight cargo should be her register tonnage, the term cargo to include coals in a steamer and stores in all ships. The light line would be marked and then a load-line would be fixed by authority, and the cubic content of the zone bounded by these lines ascertained and converted into tons deadweight (of 29 cwts.) by dividing its content in cubic feet by 35.

This proposal will be seen to be based on an assumption as to the vessel's value for freight, and Mr. Waymouth does not, by seeking to make her pay for accommodation received, attempt the impossible task of seeking a common measure for things in their nature incommensurable. We agree with him that the best basis of tonnage is some measure of the vessel's capacity for cargo or for what earns freight, but we think the roomage ton is a better measure than the ton of deadweight. Passenger carrying is almost the sole employment of some coasting steamers, and even in the case of large trans-Atlantic steamships, the carriage of passengers brings in a large portion of the earnings, and would be very inadequately accounted in any deadweight tonnage. With a view of partially getting over this objection, Mr. Waymouth proposes to fix by a central authority the maximum load-line of every ship. In the case of vessels employed in carrying passengers or light cargoes this would be a purely imaginary line, the line to which the vessel might load in the most favourable circumstances in summer and when she had no passengers. This would determine her tonnage, whether she loaded down to it or otherwise. Mr. Rothery also inclines to the opinion that an official load-line should be associated with tonnage but is willing to try displace-

ment tonnage with a load-line fixed as at present by the owner. In the latter case we need hardly say the owner of the passenger steamer would at all events be in no difficulty. In fact, a system of displacement tonnage must either let one class of vessels off with a low tonnage, and this class perhaps of all others the least able to pay, or else it must mark an imaginary load-line showing how much deeper the vessel may be loaded than she is usually loaded. In order to discourage deep loading in some vessels and to do our best to bring it about in others.

The Commissioners, that is, the majority of them, wisely decide that it is not advisable to mix up two most intricate questions; the load-line difficulty is by itself still a difficulty, to connect it with tonnage would only be to introduce fresh complications. We do not ourselves think it necessary even yet that Government should undertake the duty of fixing the load-line for all merchant vessels. Mr. Waymouth says that the "present system by which a shipowner fixes the load-line of his ship has contributed in no small measure to the prevalence of deep loading, and in some instances, to dangerously deep loading, there being very few shipowners who have the technical knowledge necessary to determine the load-line of a vessel."

We have always maintained that if a shipowner has not this technical knowledge, it is his duty to employ those who have, just as in regard to the construction of a ship he employs Lloyd's Register to prescribe for him the scantlings, the method of construction, &c., so a technical authority like Lloyd's might well undertake to fix the load-line for untechnical shipowners, only their authority in this matter should just depend upon the worth attached to it by shipowners and underwriters. It may be that, as recently indicated by Mr. Chamberlain, it will be found necessary to institute some central authority with power to determine the load-line, but there are great and certain evils attending any such course, and they must only be incurred to avoid greater evils. We have not time in this article to go farther in expressing our regret at the growing faith in government intervention characteristic of the last few years, we hope and believe it is only temporary and that the public will soon return to a better state of mind. Anyhow we cannot but think that on this most complex question

most of those interested will conclude with the majority of the Commissioners "that if adopted at all such a load-line should be dealt with in reference to what is its real object, viz., safety. It should not be mixed up with a question of tonnage."

There is further the proposal that the dues on shipping should be charged for each voyage on the ship and the actual weight of cargo landed, that is, that there should be no fixed tonnage at all. There would for every ship be got out a scale showing the weight of cargo corresponding to any mean draught and thus the draught for the voyage would determine the tonnage to be paid on. The position of the vessel's load-line would not be prejudged, but she would for every voyage pay for the deadweight actually carried. If weight of cargo carried were the only thing to be measured, we should decidedly vote for this, which is Admiral de Horsey's plan of displacement tonnage. All the proposals we have described and others besides have been mixed up, and the same term applied to all of them, whereas only the last is really in any true sense displacement tonnage. Mr. Waymouth and to some extent Mr. Rothery contend for tonnage up to a marked load-line which may be in the owner's judgment an unsafe line and which will consequently never be the vessel's real load-line, and Mr. Rothery proposes to use the roomage ton divisor which of course has nothing whatever to do with tons displacement.

In this connection we cannot do better than quote a paragraph from an able letter in the *Times* of September 1st, signed "A Royal Commissioner," but which appears from subsequent correspondence to have come from no less an authority on the whole subject of naval architecture than Sir Edward Reed.

"But neither of these schemes" that is, those of Mr. Rothery and Mr. Waymouth, "at all satisfies the mind of Admiral de Horsey. He also seems to think that a displacement tonnage 'must be adopted sooner or later,' but he seems to think both the foregoing schemes not only wrong but even irrational, for he says, 'Surely the rational charge for dues should be based upon the actual displacement tonnage at the time,' and he suggests what is evidently a carefully-considered plan for carrying out such a system. By comparison either with Mr. Rothery's, or Mr. Waymouth's

They however furnish the means of carrying cargo, and the majority of the Commissioners think that water-ballast space should be included in the tonnage.

Under the arrangement known as the MacIntyre system, the tank being really an addition to, and not part of the structure of the ship, there was no difficulty in dealing with the case under the existing law. This prescribes that the depth should be taken to the upper side of the floor, deducting therefrom the average thickness of the ceiling planking; for *floor* in a wooden ship, read *floor-plate* in an iron ship, and it follows that the measurement will include the ballast-tank, or rather that part of it above the floor-plates. Within the last few years, however, vessels have been built on the cellular system, in which the framing of the ship extends to the top of the water-ballast tank. In these vessels the Board of Trade have not been able to insist upon any other interpretation of the existing law, than that the depths should be taken to the upper side of the bottom framing of the ship, thus excluding the ballast-tank from the tonnage. The Commissioners remark very justly that a ship can no more claim to have a water-ballast tank excluded from tonnage than could vessels which have permanent stone-ballast in the hold claim to have space so occupied exempt from measurement. They therefore recommend that the depths should in such cases be taken to the depth of floor-plate which ships of the same size would have, if framed as iron ships always have been till within the last few years. We cannot but think that too much has been made of this question altogether, considering its really very small importance. Mr. Rothery for instance ridiculously exaggerates the whole affair when in a remark on the proposal of the Commissioners as to limitation of depth of floor to be allowed in measurement, he expresses his opinion that not the total difference in tonnage due to the inclusion of the tank, but a difference merely in the way of making the limitation would affect the gross tonnage to the extent of some hundreds of tons. It is unnecessary to spend time in refuting a wild statement like this. There could really be little difficulty in fixing the depth to be allowed, any difference in opinion would only be a difference

additional space gained by "cheating tonnage" was of little or no use, unless it could be properly closed-in. This was in many cases ultimately done, and then the spaces were added to the tonnage of the ships, thus practically vindicating the principle of the tonnage laws.

We cannot better conclude than by quoting that part of the Commissioners' report in which they summarise their reasons for affirming the principle of the existing tonnage laws:—

"After carefully weighing all the considerations surrounding this complex and difficult subject and having special regard to the following facts:—

"1. That the 39,000 ships of all descriptions and sizes, constituting the British Mercantile Marine are now admeasured under a system based on internal cubic capacity, with deductions for crew and propelling space, and that the mercantile and shipping community are familiar therewith, and base their transactions thereon;

"2. That all the chief maritime countries of Europe, the United States, the Suez Canal Company, and the Danubian Commission have adopted our system, and that it is very desirable for statistical purposes and uniformity of taxation that an international tonnage should be established;

"3. That the duties levied in British and many foreign ports and by the Commissioners of Lights are on our present tonnage, and that great confusion, expense and difficulty would arise on their re-adjustment to any other system;

"4. That many important financial engagements are based on dues levied on the present system;

"5. That anomalies and inequalities would exist in any alternative scheme that has been suggested to us; and

"6. That one of the merits claimed for these alternative systems is that they practically arrive at the present tonnage by other means. We have come to the conclusion that we cannot recommend a change in the law which would affect the principle on which tonnage is ascertained, viz., the contents of the internal capacity of the ship represented by a roomage or space ton of 100 cubic feet, with deductions for propelling space."

thickest and most intense portion. These chimneys have different end pieces to suit the different sizes of the flames of the various powers. Surrounding each light is an arrangement of lenses (the principle of which will be explained in another chapter) by which the power of the light passing through them is enormously increased and the rays sent out in a more or less compact beam. Against the gas system it is asserted that much of the light produced by the triform and quadriform arrangements is practically wasted so far as the seaman is concerned, that it is diffused in the sky and does not reach the horizon at all; on the other hand, the gas advocates claim for this "ex focal" light that it is of the greatest value to the mariner when the actual beam is rendered invisible, for by its illumination of the sky and glare in the turbid atmosphere its locality is made known at times when a powerful condensed beam with a small angle of divergence would yield no such evidence of its whereabouts. There is, however, no doubt that a really splendid light is obtained from gas, and that it possesses some special advantages for lighthouse purposes which add to its practical value. Dr. Tyndall's opinion is that "It may be beaten in point of cheapness by mineral oil, but in point of handiness, distinctiveness, and power of variability to meet the changes of the weather, it will maintain its superiority over all oils." As a matter of fact, it has been adapted to meet the requirements of fixed, intermittent, revolving, and group flashing lights, and is said to answer admirably in every case. The chief difficulty in the way of the more general use of gas appears to be its costliness. The gas has to be manufactured at the station, which entails the erection of gasworks, comprising retort-house, gas-holder, and other buildings. Expensive cannel coal is used for making the gas, the retorts being heated by a cheaper kind of coal, but a good deal of expense may be saved by using as fuel the tar produced. The ordinary operation of gas-making has to be gone through each day, probably more attention being paid to the purifying process than is devoted to it in the manufacture of gas for large towns. The consumption of gas per night of 8 hours, with a 48-jet burner, is about 900 cubic feet, and the total cost per 1000 feet is stated to be about 10s. The increased cost of lighthouse gas as compared

with city gas is of course due to the fact that gas produced on a small scale is more costly than that made on a large scale.

As compared with oil light it is clear that gas is equally effective for lighthouses, but it has not yet been demonstrated that it is cheaper, consequently its extension is not rapid. This is probably a great future for gas as a lighthouse illuminant, and if the process of manufacture can be simplified, the price of coal reduced, or an efficient means of safely storing large quantities of gas be discovered, there is little doubt that oil would fail to retain its present supremacy.

As regards its great rival, electricity, of which we are about to speak, there is some difference of opinion as to the relative merits of the electric and gas lights in a misty or foggy atmosphere. It is strongly asserted on one side that the electric light has greater power than any other luminary of penetrating fog, while the opponents of that theory affirm that in foggy weather the electric beam is more readily quenched than the beam from gas or oil light. It is not a question of relative intensity or candle power that is here involved, for in this respect there is no doubt whatever as to the superiority of the electric light, but it is a question connected with the colour of the lights. It is well known that red and orange rays are not so soon absorbed in their passage through a thick atmosphere as are violet rays, and it is asserted that in gas and oil lights the red rays are more predominant than in the electric light, in which the violet rays appear to have pre-eminence. This of course is an exceedingly important point in connection with lighthouse illumination. In clear weather a four-wick oil lamp is quite able to send its rays with good effect to the horizon, and it is therefore for periods when the transparency of the atmosphere is more or less obscured (a condition which at our latitude may be regarded as the rule rather than the exception) that these powerful lights are wanted. If it should be proved that the electric light succumbs sooner than the gas or oil light to the obscuring influence of fog, it would detract seriously from its value as a lighthouse illuminant. This is a question which requires to be definitely solved by careful and exhaustive experiments. Meanwhile gas will doubtless continue to hold its own, and

in the hands of its present able *entrepreneurs* will be developed into further utility. The stations now lighted with gas in the United Kingdom are—

Haisbro', two lighthouses on the coast of Norfolk.

Howth Bailey, Dublin Bay.

Wicklow Head, E. coast of Ireland.

Hook Tower, entrance to Waterford Harbour.

Mine Head, near Dungarvan, Co. Waterford.

Galley Head, S. coast of Ireland, Co. Cork.

St. John's Point, N.E. coast of Ireland, Co. Down.

Rockabill, E. coast of Ireland, Co. Dublin.

and it is said that two other stations in Ireland, viz., Copeland Island and Tory Island, are about to be converted to gas establishments.

It will be seen from the above that gas is made somewhat of a speciality for Irish lighthouses and much credit is due to those who have pushed the system to its present stage of development.

ELECTRICITY.—It does not appear to be generally known that as far back as 1857 trials were made in this country with the electric light for the illumination of lighthouses. At that time Professor F. H. Holmes had, after much persevering effort, succeeded in turning to practical account Faraday's grand discovery of electric induction in a coil of copper wire. The generation of electric currents by the voltaic battery had long previously been known as capable of producing light and heat, but the enormous expense attendant upon the production of light by this method was for fifty years an effectual bar to its application for practical purposes. Faraday's discovery in 1831, and Holmes's mechanical realisation of it in 1857, enabled the electric current to be utilised for light-giving purposes.

Holmes's apparatus was termed a magneto-electric machine, and, after some careful experiments with it at South Foreland in 1858, the results obtained from this most ingenious piece of mechanism, in Faraday's own words, "practically established the fitness and sufficiency of the magneto-electric light for lighthouse purposes so far as its nature and management are concerned." Without going into details it will be sufficient to state that, after many experiments

in 1857, 1858, and 1859, it was agreed to make a practical trial of the new illuminator in place of the oil light at the dangerous point of Dungeness on the Kentish coast. Some difficulties were still to be overcome, and it was not until 1st February, 1862, that the electric light shone from the Dungeness tower. The experience with this light was far from encouraging. There were many failures, and the stand-by oil lamps had to be frequently resorted to. Much of this irregularity was doubtless due to imperfections in the apparatus, but a portion was also probably attributable to the want of knowledge on the part of the lighthouse keepers to whom the system was novel and unfamiliar. Nevertheless the trial was persisted in until the failures became less frequent, and the light was maintained with comparative regularity.

In 1867, Holmes's attention was called to an improved machine made by the Alliance Company of Paris, two of which were in use at the lighthouses at Cape La Héve in France. This new machine was unquestionably a marked improvement on the one constructed by Holmes for Dungeness; and as it was then intended to show the electric light from a new lighthouse at Souter Point, Durham, Holmes made two new machines, embodying all the improvements of that of the Alliance Company, and these machines, after being shown at the Paris Exhibition of 1867, were in due course sent to Souter Point. Since January 1871, this point has been crowned with the electric light, much to the satisfaction of mariners entering the Tyne or navigating up and down the N.E. coast.

The extension of the electric system was carried further in 1870 when it was established permanently at the two lighthouses on the South Foreland. Holmes's improved machines similar to those at Souter Point were employed.

In 1874 the electric light at Dungeness was discontinued, the oil illuminant being resumed. The reason for this apparent retrograde step was that Dungeness is very low and the continuing growth out of the point had set back the lighthouse so far that the actual ness which it was intended to indicate, that to the mariner navigating in its vicinity, the light appeared to be but sligh

elevated; and at times the full glare of the electric light at a low elevation was complained of as dazzling and bewildering, so much so, that it was impossible to judge accurately of the ship's distance from the shore and most difficult for those on board a vessel approaching the point to see the lights of any vessel which might be between them and the shore. Moreover, the question of renewing the apparatus was under discussion, and as the electric machinery there was regarded as obsolete, it was resolved to put a small oil light on the extreme point, and revert to oil, with the addition of an improved arrangement for exhibiting the light, for the old tower, it being understood that the electric system was to be extended to the important station of the Lizard Point on the coast of Cornwall.

An important discovery, made simultaneously by Dr. Siemens and Sir Charles Wheatstone, that induced electricity could be generated in great force without the use of permanent magnets, brought about the construction of what are known as dynamo-electric machines. In some exhaustive comparative trials carried out at South Foreland in 1876-7, the dynamo machines constructed by Messrs. Siemens were found to yield superior illuminating results, as compared with any of the magneto-electric machines previously constructed. The question as regards the application of electricity to the lighthouses at Lizard Point being then under consideration, it was resolved to exhibit the electric light from the two towers at that station, the light to be produced by Siemens' machines.

This completes the historical statement concerning the application of the electric light in the lighthouses of this country up to the present time, but we believe it is in contemplation to proceed further with the system.

The general nature of the machinery employed and the arrangements in operation for exhibiting the electric light at lighthouses may be briefly and popularly described as follows. The first thing required is motive power: at Souther Point and South Foreland steam engines are used; at Lizard caloric or hot air engines are employed. These engines are necessary for working the machines by which the electric currents are generated. In the case of the

magneto-electric machines the principle is Faraday's discovery that an electric current is induced in a coil of copper wire when it passes the poles of a permanent magnet. Accordingly the magneto-electric machine consists of two parts—viz., magnets and coils of wire or helices as they are called, the object being to cause the helices to rapidly pass the poles of the magnets. Each magnet is made up of six superposed plates, and is curved in the usual horse-shoe shape. Each coil of wire is wound round a cylinder or bobbin of soft iron, the wire being insulated. The magneto-electric machine as used at Souther Point and South Foreland consists of seven parallel series of magnets, so arranged that the poles of the eight magnets in each series converge toward a central axis or shaft. These circular frames of magnets are fixed at equal distances from one another, and between them are small rotating discs mounted on the shaft, each carrying sixteen coils of wire or helices, which, on the shaft being rotated by the steam engine, pass the poles of the fixed magnets. Electric currents are thus induced in the coils, strengthened as each succeeding helix passes, and one revolution of the rotating wheel causes the sixteen helices to pass the poles of eight magnets. Imagine then the six wheels revolving together at a speed of 400 revolutions a minute, and some idea will be obtained as to the force exerted by the whole machine when working in the production of electricity. By this process alternating currents of positive and negative electricity are generated in the coils and are taken off from the axle of the rotating wheels and transmitted where required by conducting wires. Having thus obtained the electric current, the next thing is to cause it to yield the desired light. The conducting wires are carried up to the lantern, and their ends are affixed carbon pencils. If the ends of the wire were joined together, the circuit would be completed, and the current would flow through without making any display of electric force; but the carbon points are brought close to each other, and the passage of the current from one point to the other is opposed by a small interval of air; in the effort of overcoming this opposition great heat is developed, which makes itself apparent in the incandescence of the carbon points, and the consequent flow of incandescence

matter from one terminal to the other acts as a bridge across which the current passes. The proper distance between the carbon points is maintained by a regulator, also known as the lamp, which automatically moves the carbons towards each other as fast as they are consumed.

At the *Lizard*, as has been stated, dynamo-electric machines, in which the electricity is generated more by means of dynamic force than by permanent magnetism, are employed. By the interaction of the coil and of the latent magnetism in soft iron, it was discovered that currents of extraordinary power could be produced without the aid of permanent magnets. The development of this discovery was much aided by the improved armature of Messrs. Siemens, in which coils of wire are wound longitudinally round a cylinder of iron, the cylinder being caused to revolve near the poles of electro-magnets around which coils are also wound. The very feeble current so induced in the coils of the armature is made to traverse also the coils of the electro-magnets, whereby their magnetic intensity is increased and they react on the armature. In this way the current and magnetism go on mutually re-inforcing each other until a very strong current is accumulated, which is taken off by conducting wires to the lamp. These machines are much more economical in original cost and in working, they are less complicated in construction, occupy smaller space, and are not subject to deterioration by the weakening of magnets, to which magneto-electric machines with permanent magnets are said to be liable, and hitherto have yielded more powerful light than the magneto-electric machines. Operated by hot air engines the machines of Messrs. Siemens have been employed at the *Lizard* since 1878.

The electric light is very beautiful as a lighthouse illuminant, there is nothing can compare with its magnificent effects on a dark night. But opinions are still divided as to its real value at all times. Mariners have not yet fully learned how to accommodate themselves to its dazzling brilliancy, and complain at times of its bewildering influence, moreover they are not yet fully assured as to its superior efficiency in thick weather; but on the other hand who can be more glad than the weather-tossed seaman

and on the *chart* by the intersection of two *curves of altitude*; so that the real problem of nautical astronomy is resolved into the tracing of a curve of altitude on Mercator's chart.

The *New Astronomical Navigation* gives the means of tracing this curve in all cases. When the zenith distance is small the curve blends with a circle which we easily draw on the chart; in other cases we may replace the curve by one of its tangents, called the *line of position*, and which is determined by the calculation of the *point rapproché*. The new methods furnish the means of deriving from one, two, or more altitudes, all that these can give; and thus we have, for determining the place of a ship, no longer to await the moment at which a heavenly body shall be near the meridian or the prime vertical; but only to see that the difference of the azimuths of the two objects intended for observation be comprised between 30° and 150° : and then, in all cases, we can determine a surface within which is the ship.

But the most striking characteristic of the *New Astronomical Navigation* is that the calculation of the *point rapproché* absolutely contains all that is necessary for Navigation; inasmuch as it may replace all the calculations of the old methods of Nautical Astronomy, as may be seen by what follows.

Circle of Altitude.—The calculation of the *point rapproché* begins by the determination of the *geographical position* of the observed body;—a position which having been found, and should the altitude be very great, yields a *curve of altitude* that may be replaced by a circle: thus, this calculation gives what is necessary for the solution of the problem in question.

Variation.—The first logarithmic computation of the *point rapproché* gives the azimuth of the observed object; and consequently the variation by the comparison of this azimuth with the magnetic azimuth.

Point Rapproché.—*Line of Position.*—In all cases this calculation gives: 1° the *point rapproché*, which is always nearer to the true position of the ship than is the estimated position by dead reckoning; 2° the *line of position*, *i.e.*, a line on which is the ship.

Position of the Ship.—Two *lines of position*, when the altitudes

The results of the *New Astronomical Navigation* have given rise to a very remarkable coincidence. It has been shown that practically an altitude of a heavenly body (conditionally that the time at the first meridian be exactly known) determines on the chart a circle or a straight line on which is the ship; now, this circle and this line are completely equivalent—the first to the circle given by the altitude of a known terrestrial point, and the second to the bearing of the same point. Thus the results obtained by the observation of a heavenly body are the same as those afforded by a terrestrial point—a lighthouse for instance; therefore we may say that the *New Astronomical Navigation* proves that, for the determination of the place of a ship at sea, the *heavenly bodies are for the Navigator's purpose like so many lighthouses in sight.*

BRITISH WAR SHIPS.

IN continuation of the subject discussed in the article on "Coast Defences," which appeared in our last number, it may be affirmed that it would be well if the *Minotaur* class were the only deceptive ships of the fleet; unfortunately the *Warrior*, *Black Prince*, and *Achilles* are in the same category. Indeed, under the fire of the guns now forged they might be worse off than an unarmoured ship, for it would be better to let a projectile pass unresistingly through than to attempt to stop it with imperfect armour.

Their huge masts and yards, exposed rudders, and steering-gear are sources of danger which an active enemy would not fail to take advantage of. The size of these spars excite one's wonder, for they appertain to an order of things which ought long since to have passed away.

With such deceptive ships it would be folly to meet those of modern construction whose formidable guns, thick armour, general handiness, and higher rate of speed must render them superior on

all points in action. It is hard to voluntarily abandon cherished opinions, still such a course is preferable to being pelled to do so by the sterner law of necessity.

From this class let us turn to those of a more recent which at one time were believed to form the nucleus of the the *Invincible* and her sister vessels. Here a fatal mistake made in erecting one battery over another. Should a shell fall in the lower one it would in all probability destroy both, or at least create a panic which might seriously affect the results of an action. Again, the smoke from the lower battery obscures the view of the upper, thus rendering correct firing an impossibility. As a matter of fact, firing in calm weather is frequently stopped several minutes at a time from this cause.

It is an essential necessity in a well-conditioned ship that her ports should be at such a height from the water level that they will not only allow the captain of the gun to take a steady aim over the crests of the waves, but permit them to be opened in all weathers; but the vessels now under consideration fail on this important point. If guns are wrought of such large calibre that a single shot may be fatal, it is desirable they should be placed in high positions to ensure their being used on all occasions. When it becomes necessary to close the ports at every lurch it is to seek safety in flight, a proceeding which is not in accordance with England's traditions.

The masts and yards are of unusually large proportions, and the centre of gravity of the hulls so high that Portland cement and scrap iron had to be put in the double-bottom to render the vessels stable enough to counteract the enormous area of canvas they spread. This additional weight appears to have completely spoiled their sailing. It is singular to note how greatly a vessel's immersion beyond that calculated on by the designer, appears to impair the sailing qualities of men-of-war. It is difficult to comprehend why this should be the case, for it scarcely affects a proportioned merchant steamer, as the abstracts of well-kept vessels distinctly prove. The risk of damage to the propeller by the falling of their masts and yards has been alluded to in another paper and need not be referred to here.

Vessels of this class have proved to be good sea boats, and remarkably steady in bad weather, qualities of great value, without which the battery of the most formidable ship cannot be depended on. It is unquestionable that poops seriously interfere with the effectiveness of fighting ships, add a great quantity of inflammable material to the hulls, and detract from their general handiness. Sooner or later the correctness of this criticism will be acknowledged and acted upon. The honour of the country, not the individual comfort of a single officer must first be considered. At no remote period, my lords sternly and wisely prohibited any attempt to make a man-of-war of any denomination otherwise than what she was really intended to be, but kindlier feelings are evidently prevailing, and petticoats are not uncommon on board Her Majesty's ships. Unless the defect has been recently remedied, the position of the bulkheads is a source of weakness. In the after-part, one of the principal extends only to the main-deck, so that if the compartment were full, the water would swash over the coamings in a seaway and imperil the safety of the ship. Neither had they the fore-and-aft bulkhead amidships, a plan due to the writer of this article, but like many others appropriated without acknowledgment. Taken as a whole it may safely be predicted that future constructors, while admitting the good qualities of the *Invincible* and her consorts, will doubtless avoid the errors into which her talented constructor has fallen.

The next type, represented by the *Royal Alfred* and her consorts, are scarcely worthy to be enumerated in the lists of modern ships of war. In perfectly smooth water their guns would enable them to cover a landing, but only those who are acquainted with their performance from actual experience can form an idea of their qualities in bad weather. Their arcs of rolling have been so often published that it is unnecessary to enter into particulars here. At the time of their conversion they supplied a certain want, and it would be ungenerous to comment in any way but in terms of praise on the boldness and genius of those who carried out the design. In all probability incipient decay has long since weakened their connections and acted injuriously on the frames, and it is probable that the concussion of a heavy projectile, or the explosion

of a shell below deck would prove fatal to ships which cannot be said to have any system of bulkheads. Their consumption of steam at full speed, which should always be taken as the unit, is so great that with the wing passage full they cannot steam more than a few days, one only of a long list of defects for which they are only too well known.

Torpedoes have so greatly changed naval tactics as to render the handiness in manœuvring an indispensable quality of a fighting ship. An action between torpedo boats and the *Minotaur* or *Achilles*, if the former were efficiently backed by a few heavy guns, cannot be contemplated without grave feelings of anxiety. In this country and Russia should ever be again plunged in war over the interminable Eastern question, no British Admiral would dare repeat the tactics of 1854. Neither Sebastopol nor Cronstadt could be blockaded by a fleet at anchor without incurring certain destruction. Revel, Hango, Sveaborg, Odessa, and Batoum would swarm with those serpentlike torpedo boats which when painted grey defy the keenest vision to detect their presence at a "measurable distance" in the uncertain light of a hazy morning. It is presumed that the Channel Fleet represents England's offensive force for service in the Baltic. Great as the draught of water unquestionably is, English officers are equal to the task of navigating them safely through the shoals of the Gulfs of Finland and Bothnia. But the question is whether the armaments of these ships of the past be utilised as means of offence for this service, or will their presence in the waters of the north add to the responsibility of the Navy, and the anxiety of England in general. From a practical acquaintance with the points indicated, it is pretty certain that the present able sea Lord of the Admiralty would hesitate to answer the first question in the affirmative. They might watch the Belts and the Sunda Straits without incurring great risk, but to watch Sveaborg or Cronstadt would result in certain destruction. No vigilance can cover all the impossibilities. From these considerations it is incumbent on the Admiralty to follow with certain modifications the custom of preceding generations by building ships of a type adapted to the conditions of northern warfare, light of draft, strong of hull. The

draught "seventy-fours" and "sixty-fours" of the day met the exigencies of the situation, but armour and heavy guns have rendered much of our former experience obsolete, and the problem must be taken up under greatly altered conditions. At the outbreak of the last war the councils of England were guided by the opinions of officers whose ideas were those of a past century. The signal of Sir C. Napier to the fleet, "Sharpen your cutlasses and the day is your own" was read with derision by the rising officers who commanded under him. Had an Admiral with the genius of Nelson led the fleet his keen glance would at once have detected that the tactics which proved so successful at St. Vincent and Trafalgar were not applicable to steamships and granite batteries. Let us take a lesson from the grave mistakes then made, and remember that ships of four hundred feet in length will, for practical purposes of offence and defence, prove as unequal to meet the altered conditions of warfare as the fleets of Napier and Dundas did to attack the batteries of Russia a quarter of a century since. It is doubtful if those officers would have effected much had they been furnished with all the appliances of attack which modern inventions then rendered possible. Age had chilled those physical qualities without which success was an impossibility. But what was of more importance still, neither had attempted to advance with the times, or were masters of the practical science even then necessary to successfully carry on war. The signal alluded to proves this assertion so far as Sir C. Napier is concerned. His successor was careful to accept no risks, although furnished with more appropriate weapons. The bombardment of Sveaborg cannot be called a success, for even the fleet moored under its walls escaped uninjured, showing that it is useless to provide men with weapons whose use they imperfectly understand. Doubtless many an old officer as he reads of the advancement of young men to high command curls his lip, and thinks how much better he could do if placed in a similar situation. Why should he? Statistics prove that the present generation is stronger, will bear more physical fatigue, carry their age better, and above all is more highly educated than that which preceded it. On what grounds, then, do they base this

assumption? Nothing but the jealousy with which age regards youth, especially successful youth. The world is heirloom of the young. Let not the old who have had the be envious of them during their short reign of power; the will end likewise. The officers of the Baltic fleet suffered the incapacity of their leaders, augmented by personal quarrels. The men who were so fortunate as to carry a few store battalion of artillery to the Black Sea were decorated with Turkish and Crimean medals; but those who cruised for years until the end of December in the narrow waters of the Gulf of Finland, amidst snow, and ice, and fogs, and biting gale wind, received no mark of the appreciation of their Sovereign beyond the ordinary medal. During the long nights of eight hours, when members of the crews were frequently frost-bitten and their fingers chapped to the bone, they did duty with murmur, often beating the ice from the braces before the masts could be swung. The captains and masters were up night after night, for in a space not forty miles square, unmarked by light beacon, it was absolutely necessary to use more than ordinary vigilance. Not a ship was lost, but the Admiralty, who could have been proud that they possessed officers competent to perform such a service, looked coolly on and showered honours on the more favoured Black Sea fleet.

It is singular to note the advances which science has made in marine architecture, steam, and gunnery within the memory of men who are still young. With the exception of a single vessel, the whole of that magnificent wooden fleet which Her Majesty reviewed at the close of the Crimean war have disappeared from active service. They would be no more fitted to cope with the modern ironclad than the *Great Harry* would be with the *Invincible*. It is no exaggeration to say that the guns of the *Invincible* had it been possible for her to have appeared on the scene, would have destroyed every ship with impunity, and probably with damage to herself. The naval battles of the future will be fought out with guns, armour, and torpedoes. These will represent science, but the ram, under the guidance of clear eye and cool head, may often rise superior to the other three. It is impos-

to study the history of the collisions which are constantly taking place between merchant ships and remain ignorant of this important fact, notwithstanding the opinion of a gallant admiral at a Meeting of the Royal United Service Institution, who alleged that not one man in ten would have the moral courage to attempt it in actual warfare. He may rest assured that English naval officers will not as a body endorse his sentiment. The same spirit that animated the sailors of former generations only requires the opportunity to equal the boldest deeds of the past. But it must not be forgotten that the profession of war, like all others, requires practice to perfect it. At the commencement mistakes are sure to occur, and as the Duke of Wellington once said of his generals, he is the best who makes the fewest. Indeed, if not serious, a repulse is in some instances of more service than an unbroken success when first starting in life.

It is evident from the description given of the ships of the first Reserve Squadron that they are in nowise of a construction to warrant a great degree of confidence being reposed in them if brought in contact with modern ironclads. Who is the admiral who would feel secure, if necessity compelled him, to blockade with the *Lord Warden* the iron-bound coast of France, or the dangerous lee-shore on the eastern side of the North Sea? That fatal bight is strewn with the bones of English seamen, the effects of a strong surface current, north-west gales, and imperfect reckoning. We cannot afford to repeat such catastrophes.

The rams of the *Rupert* class are, by reason of their light draught of water, well adapted for coast defence, but questionable as sea-going cruisers. They all have too much top-hamper for an enemy to aim at, and too little protection from vertical fire. Here again we may take a lesson from the Chilians, and mark with what singular precision they dropped their shells at an extreme range on to the decks of the Peruvian men-of-war at Callao. The Chilean officers doubtless received their training from British gunners, and show by their action that the lessons of their instructors were well appreciated. It is perhaps unwise to teach other nations all that the troubled condition of Europe renders so necessary to this country, because it is uncertain if the knowledge

thus imparted may not in the future be employed against it. It would be useless to attach much value to the obsolete wood frigates which are even now occasionally employed, although it is not uncommon when the battle of the guns and armour is discussed to hear it stated that we shall return to wood again. Science never retrogrades, it may from the effects of the faction opposition of unpractical, unscientific, or prejudiced men occasionally be headed off for a time, but only to return with increased force and an overwhelming conviction. It was thus with iron ships, the gunnemen of a past age absolutely and unconditionally condemned in as a material for ship construction alleging that the splinters were more damaging in their effects than a charge of grape shot. Time has dispelled this illusion, and there is no more chance of returning to wood than there is to bows and arrows. If it were otherwise these marvellous torpedo launches would have led the way, but no one has even hinted at such a proposition. The day is not remote when a ship of British oak will be a curiosity in the royal or mercantile navies. The upholders of this theory cannot have studied the effects of a shell on a wooden ship, missiles to which the red-hot shot of former days bear no comparison. Genius and courage sometimes rise superior to circumstances. This was shown in a marked manner at Lissa when the gallant Austrian Admiral Tegethoff in his wooden flagship rammed and sank the Italian ironclad. That action great as it undoubtedly was, simply proves that men of conspicuous talents make victory seem regardless of the material at their command. As the gallant Sarsfield is reported to have said at the Boyne "reverse the leaders and see what the results" will be. Doubtless had Tegethoff and Persano exchanged commands different results would have followed. In sober calculation however, a nation has no right to adopt extreme heroism as a factor. The great German strategist never did so, and in the probability gave the balance against his sober-minded indomitable countrymen. Of these beautiful wooden corvettes, it is impossible to speak without affection. Alas that they should be so useless possessing neither commanding speed, great coal capacity, fighting powers, nor fitness to compete with vessels which science can without difficulty produce. The sinking of the *Alabama* indica-

too truly the danger to which the whole class is subjected in war, and the action of the *Shah* and *Champion* with the *Huascar*, further confirms their unfitness for any service but that of marine police. An ordinary projectile may pass clean through a wooden hull without doing more injury than a shot plug can make, but a shell lodging below water in a wooden hull would blow the side out. Whatever the discomfort may be to individuals, we must build ships with plenty of bulkheads, as the only resource against the missiles of modern warfare.

The most important question of the day is armour plating; owing to the enormous increase in the power of guns it is doubtful if it can be carried of sufficient thickness to resist penetration; and if it could, what size scantling and plating would be required to attach it to? This will long remain a vexed question, because it presents itself from so many different points of view. For example, at certain ranges, a shot would drop harmless after striking armour, although it would have gone clear through ordinary plates used in the construction of an iron ship, possibly in its course disabling a gun and slaying any number of the crew. But there are good reasons for believing that at certain ranges a shot which might not penetrate would inflict such serious injury on the hull as to cause a dangerous leak, or what is of equal importance, derange some of the exquisite machinery on which the working of the guns depends. So true must heavy bearings be made that the slightest derangement would affect them, or a turret might be immovably jammed by a small amount of concussion. Both of these possibilities must be carefully considered in deciding on the advantages and disadvantages of both systems. It has been alleged that cover is now deemed to be essentially necessary for the gunners. It is difficult to see why this should be more required on the sea than it is on the land. On the latter the artilleryman has not only to stand up to the fire of the enemy's cannon, but may in addition have to sustain a murderous fusillade of small arms in the open. From this the seaman could be in almost every instance protected. His risk would arise from the splinters which the formidable missiles now in use will freely scatter wherever they penetrate an iron plate,

will more than compensate for their presumed safety. Could they, and the fittings by which they are manipulated be made absolutely invulnerable, then much might be urged for their being partially unroofed and maintained in position. If not, the writer is of opinion that their adoption for the heavy guns now in course of manufacture will prove detrimental. In a seaway this will be more marked than when an object could be carefully followed by the officer in charge of the gun. Of course, if the turret be unroofed as suggested, a sufficient number of strong beams might be placed at right angles to each other across the periphery in order to assist it to resist the impact of shot and to serve as a protection from splinters or the *debris* of a fallen mast should such antiquated fittings still form a part of the equipment, as there is too much reason to fear they will.

It almost makes one giddy to think of the consequences which might result from one successful shot of a monster gun. Possibly not only the fate of a great naval battle but that of a dynasty or an empire might depend on it. With such a possibility in view let no crude or dogmatical opinions warp those who write on such an important subject, a subject which it is scarcely too much to say cannot be determined theoretically, and that practically it may long be delayed is the earnest wish of every lover of his country and the world's progress. At the same time the most enlightened men of the age have reluctantly come to the conclusion that we cannot stop this ceaseless preparation for war, and however humiliating the prospect appears to be, the nation can only accept what circumstances have made necessary until the political horizon clears or man's nature alters.

The writer has purposely avoided making remarks on the *Alexandra* type, as she certainly appears to be a most formidable vessel, one well calculated to enter the lists against any afloat, and so long as money is forthcoming for the construction of such vessels the country may rest satisfied that it is well laid out. It has been alleged that by the building of such ships we have placed too many eggs in one basket. In a commercial point of view this may be true, but war cannot be regulated by this standard. On the contrary, the most lavish

expenditure in the first instance is often true economy in the end, and it is highly probable that the cost of the *Alexandra*, put into ships of half her size, would not be so effective as she. So long as other nations build leviathans, England must take the lead in this as in every other advance in naval warfare.

The *Inflexible* and her consorts are, at this moment, the occasion of an unusual controversy between the greatest marine engineers and mathematicians of the day, and it would be presumptuous for smaller men to enter the lists even with all the necessary data before them. The writer is certainly of opinion that if the stability is not to be relied on without cork fillings, it cannot do without, and there are other disadvantages which must be taken into consideration when it becomes necessary to use it. In the early days of iron shipbuilding cork shavings were largely used to fill up the openings between the outer and inner skins, abreast of the saloons and state-rooms, as it is a good non-conductor of heat. Experience proved that in this position it rapidly absorbed moisture, decayed, and emitted a disagreeable and injurious odour. From this experience it is not unreasonable to assume that a similar evil may attend its introduction in the *Inflexible*.

As the press is noticing the salient points of this essay it is possible that it may be continued. The *Times* in a recent article, comparing the old school and the new, commented on the desirability of encouraging officers to think and write on professional subjects in order that the heads of departments might sift the few grains of gold from the many heaps of chaff. The old school were deaf against such a system and consequently lived in ignorance of the innovations which were making shipwreck of their ideas. Year after year it was evident that the future of the Navy was indelibly wrapped up in the utilisation of steam, a well-known admiral used to speak of the few steamers of his fleet as "things with funnels." Wiser counsels now prevail and the fear now is that young officers will plunge so deeply into the theoretical as to neglect the practical. Should they do so, the rough lessons of real service will convince them of their error.

W.

MACQUARIE LIGHTHOUSE.

NEW SOUTH WALES.



NOVEL kind of illuminating apparatus is about to be introduced at the South Head lighthouse, Macquarie Head, near Sydney, New South Wales. The apparatus is designed for the exhibition of either a gas or an electric light, the former to be used in clear weather, the latter whenever the atmosphere is impaired for the transmission of light. The gas is to be supplied from Sydney, $2\frac{1}{2}$ miles distant, and the electricity is to be produced by one of De Meriten's magneto-electric machines. Hitherto the smallness of the electric luminous point has necessitated the use in lighthouses of the small third, fourth, or sixth order dioptric apparatus for focussing it properly, but with these lower orders the full efficiency of the luminary is not developed. An arrangement of prisms has now been devised by which the vertical and horizontal divergence of the direct light is considerably increased, and which enables a first order dioptric apparatus to be satisfactorily utilised for the first time with the electric light. The character of the light is flashing, the flash occurring every minute. The power of the electric light in focus is stated to be equal to 10,000 candles, and when augmented by the optical apparatus and concentrated into a beam, it is said to be equal to about five million candles. These are astounding figures, especially when it is considered that this power of light is produced by a gas engine which in operating the electric machines consumes about 300 cubic feet of gas per hour. The gas-light is a flame issuing from three concentric rings but condensed into so small a space that the diameter of the whole flame is only $1\frac{1}{2}$ inch. This reduction in size enables the gas-light to take the place of the electric spark. The initial intensity of this light is equal to that of 200 candles, but assisted by the lens and condensed into a beam it is said to be equivalent to 40,000 candles. In the event of a failure of the gas supply, provision is also made for the immediate substitution of an oil lamp, and the arrangements for transfer are so simple that the change from any one of the three kinds of light to another can be

made in something under half-a-minute. New South Wales is reason to be proud of inaugurating such a splendid novelty upon her coast line, and the authorities certainly show their wisdom in obtaining from England the latest and most efficient apparatus. We understand that the design of the new apparatus emanates from Mr. Jas. N. Douglass, Engineer-in-chief to the Trinity House, and that it has been constructed at the works of Messrs Chance Bros. & Co of Birmingham, under the immediate direction of Dr. Hopkinson F.R.S., to whom is due the credit of the entire work in connection with the calculation of the angles of refraction and the consequent arrangement of the lenses and prisms.

ON THE VARIATION IN THE RATES OF CHRONOMETERS DUE TO TEMPERATURE.

Report of the Astronomer to the Marine Committee, Mersey Dock and Harbour Board, for the years 1872 and 1875-78.

WE believe we are correct in stating that it was at the meeting of the British Association in 1854 at Liverpool, that Mr. John Hartnup read his paper "On the Variation in the Rates of Chronometers." At the instigation of that Association in 1837 the Corporation of Liverpool established a first-class nautical observatory at that port, and when Mr. Hartnup took office in that establishment, he devoted much of his time to the subject of chronometers and their rates. So far back then as 1854 Mr. Hartnup drew attention to the variation of these rates: he remarked that "the practice, almost universally adopted, has been to take for granted that this rate is uniform during the voyage: chronometers are supposed to be compensated for the changes of temperature to which they must necessarily be exposed at sea in different latitudes, and captains are instructed to use the same rate in all climates: now, we are prepared to show that, for chronometers employed in the merchant service, the average change

rate caused by changing the temperature from 40° to 60° Fahr. is *seven seconds* a day: hence, if we ascertain the rate of a chronometer on shore with the most scrupulous degree of accuracy in a temperature of 40°, and this chronometer be afterwards taken to sea and exposed to a temperature of 60° for the short period of eighteen days, the accumulated error on Greenwich time, according to the above-named average, will be upwards of two minutes; this variation of rate, from *change of temperature*, differs so much in different time-keepers, that, without a trial, no idea can be formed of its amount in any particular chronometer."

From Mr. Hartnup's first appointment to observatory duties until now he has never lost sight of the subject to which he at first devoted his attention with so much assiduity; in 1857 he issued a small pamphlet "on the importance of testing chronometers before they are used at sea, with examples to show how their most common faults may be detected;"—and he concludes with the following pertinent remarks. "The makers will exert themselves to the utmost to supply the astronomer with a good chronometer, because they know that he can test its qualities, and appreciate its value; and that he will not be unreasonable in his expectations. Not that the astronomer is often perfectly satisfied with the performance of his instruments, but he generally makes himself too well acquainted with the failings to which they are liable, to allow himself to be deceived by such imperfections. Now, *this is precisely what we wish to see in the mariner*. He is called upon almost daily to exercise his judgment as to the degree of confidence which he is justified in placing in his instruments; and a knowledge of the imperfections to which they are liable is the only thing that can guide him to correct conclusions in these, to him, very important matters."

We have quoted these observations of Mr. Hartnup's because of their direct value to the navigator.

The upshot of Mr. Hartnup's chronometric trials and tests—the result of the examination of upwards of 3,000 instruments—is, that it is entirely evident that change of temperature is the chief cause of the difference between the sea and shore rates of marine time-keepers, and that a remedy for this defect can be practically

applied by the mariner. There appears to be a definite temperature peculiar to each chronometer in which the instrument goes fastest than in any other temperature, and as the number of degrees above or below this temperature of maximum gaining increases, the chronometer loses in a rapidly increasing ratio. Assuming this law of variation to be that the change of rate is directly as the square of the number of degrees from the maximum gaining rate, the rates calculated on that assumption are found sensibly to agree with those obtained from observation; therefore, having determined the rate from observation for one of three definite temperatures, it is possible to compute the correction for error of thermal adjustment due to any other temperature. In order to do this it is necessary to find—

T = the temperature in which the chronometer has its maximum gaining rate ;

R = the rate at the temperature T ; and

C = the factor or constant, which multiplied by the square of any given number of degrees from T shows the amount of loss for that number of degrees.

For example, let N be any number of degrees from T , the rate at

$$T \pm N = R + C \times N^2.$$

The values of C and T remain the same for long periods; but, as a rule, they do not sensibly change so long as the adjustment is not altered, and the instrument remains in good condition ; but, if it is more changeable, and should be redetermined on all favourable occasions ; to find the change in R the rate must be first carefully found in some definite temperature.

A large number of masters of vessels sailing out of Liverpool have, with great advantage, availed themselves of Mr. Hartnoll's assistance and advice ; and for any chronometer which has been allowed to remain at the Observatory for a period of five years the certificate of test issued with the instrument contains the necessary data for calculating the correction due to imperfect thermal adjustment.

NOTES FROM CONSULAR REPORTS.

AUSTRIA HUNGARY.

Fiume.—A large trade between this port and Great Britain is carried on, but the returns for 1880 show a marked falling off. As compared with the previous year, 1879, exports have decreased 32 per cent. and imports have increased 42 per cent. The difference is due chiefly to the deficient crops in Hungary causing the export of grain to be considerably reduced. Hungarian flour is of high quality and is in fair demand in the English markets in spite of American competition. Exports to Germany appear to have ceased owing to the new protective duty of two marks per 100 kilos. Of other exports may be named rape seed, timber, wine, but there is nothing to be specially noted in regard to those articles. As regards imports in 1880 an increase is recorded, more particularly in cotton goods, and machinery, while coals, cotton yarn and pig-iron show a decrease. The number of articles comprised in the list of direct imports from Great Britain has risen from 30 to 50 which is a favourable symptom, yet the sum total is very insignificant and is doubtless capable of augmentation. The Consul concludes his report by saying that "the evils under which the country is ailing may be summed up in the following causes, viz., a succession of bad harvests, heavy taxation, usury under which the peasantry is groaning, not to mention enforced military service and absentee landlordism."

BRAZIL.

Maceio.—Since last year's report there appears to have been a falling off in the number and tonnage of vessels visiting this port. Cotton and sugar are still the main exports. Direct importation through the steamers of the Royal Mail Company has been of great benefit to the province and greatly diminished the imports received coastwise from ports of Brazil. Other lines of steamers have also shown a readiness to call. The sanitary condition of the country has continued good.

Rio Grande del Norte.—The improvement experienced in 1879 has continued through 1880, augmenting in all departments of trade. A favourable yield of cotton and good crops of sugar and

cereals are reported. A railway, a lighthouse and an overland telegraph are all in progress. The sanitary condition of the place has been favourable.

GERMANY.

Cuxhaven.—Cuxhaven is chiefly frequented as a port of refuge for vessels in distress or seeking shelter from northerly or westerly gales, as well as those prevented by ice from proceeding up the river Elbe to Hamburg. It is a perfect free port where no harbour dues are levied, and vessels enter and leave the port without being subject to any formalities whatever. In 1880, 1,119 vessels put in windbound, or on account of ice in the river, under average, wanting repairs, coals, anchors, chains, &c., besides 780 small coasting craft carrying turf and other goods for the use of the population, as well as materials for the harbour works, &c., and about 1,325 North sea fishing vessels.

Hamburg.—The report of the Consul-General for the year 1880 is interesting and instructive. He considers that the consequences of the late depression in trade have been at length overcome, and reports that shipping has considerably increased, that the increased ability of foreign markets to import, especially from the United States, raised the export trade of Hamburg, but that import and commission business has not been so favourable. The new protective duties do not appear to give general satisfaction to the Hamburg merchants. Being one of the great entrepôts of Europe, the record of commerce has reference chiefly if not entirely to dealings with coffee, tea, sugar, cocoa, rice, coals, cotton and other commodities imported. In many of these articles a steady increase of trade is noticeable, but as regards coffee the observations of the Consul-General are worth attention at this time when the spirit of protection is stalking about in the very birthplace of Free Trade. The Consul says, "under the new increased tariff the generally greater dearness of all articles of daily life imposes upon consumers the obligation of an increased economy, and as it is not to be supposed that the public would give up to any extent their favourite beverage, it must be concluded that the balance between their receipts and expenditure is being compensated for by the purchase of inferior qualities." The

import of coals from this country was larger in 1880 than at any previous time, but the Consul calls attention to the development of the Westphalian coal trade which shows signs of vigorous competition against the English supply. Trade in rape oil has been failing for the last few years, while petroleum business has increased. There appears to be a good market for pitch, rags, saltpetre, skins, tallow, wool, &c. For 1880 a general increase of about 16 per cent. in the shipping entering the port is recorded as compared with the returns for 1879. Great Britain has at present the largest share of the tonnage.

Lubeck.—The commerce of Lubeck for 1880 is reported as showing a decline, chiefly apparent in two articles of import—grain and timber. "In both cases," the Consul writes, "the baneful influence of the Customs plays the chief part." The export trade with foreign and German articles was more animated, particularly in Finland, Sweden and Denmark. The transit business to Russia from Hamburg and other places has been held by Lubeck for a long period, but of late years other neighbouring ports have been making great efforts to secure to themselves a share in this business, not, however, with very much success. The import of coal and coke from Great Britain in 1880 was in a healthy state, showing an increase as compared with previous years.

The deepening and straightening of the River Trave from Travemunde to Lubeck progressed so rapidly in 1880 that there is a prospect of the work being finished about the end of this year. Ships drawing 16½ feet will then be able to go quite up to the town.

Wismar.—The commerce of this small port for 1880 showed a disposition to improve. The chief articles of import are coals, timber and small quantities of grain, iron and other goods. The exports consist chiefly of grain, meal, oilseed, stoves, Dutch tiles, &c. English coals, coke and iron appear to be favourably received at this port, but not many British vessels carry the goods; out of 119 vessels arriving from Great Britain only 30 were British. It is said that the German Navy Board contemplate the establishment of a naval port at Wismar.

BOOKS RECEIVED.

The New Rules of the Road at Sea, and tending ship at anchor in a tide-way. Explained and illustrated, &c., & J. G. Moore and P. E. Le Conteur. Second Edition. L and Liverpool : George Philip and Son.

WE had occasion to favourably notice this small work on the appearance of the first edition. It has now deservedly reached a second edition. The subjects are well discussed, and the diagrams fully illustrate the letter-press.

Lectures on Naval Architecture and Engineering : with Catalogue of the Glasgow Naval and Marine Engineering Exhibition, 1880-81. London and Glasgow : William Collins, Sons and Co.

DURING the winter season of 1880-81 an Exhibition of Naval Architecture and Marine Engineering was held in Glasgow. It had been initiated by the Museum Committee of the Town Council of that important Scottish seaport, and its success was greatly due to the untiring efforts of a Committee of Shipbuilders and Engineers of the Clyde and neighbouring districts. The work now before us is the outcome of the Exhibition, and the greater part of it is occupied by nine lectures delivered by eminent authorities on various branches of shipbuilding and engineering, the progress of steam navigation, yachting and yacht-building, laying and repairing of submarine telegraph cables, &c. Each lecture is complete in itself; and the course, which was intended to be in any sense consecutive and systematic, was, on that account, and owing to the excellent treatment of each subject, of interest to the general reader. The science is concisely and popularly explained, and accompanied with a historical stock-taking of progress made. The illustrative plates and woodcuts are also numerous, and the one showing the relative size of steamers at the commencement of the century with those built in the present century is especially noteworthy. The catalogue of the things exhibited is a valuable part of the work as the lectures,—and many will doubtless consider it more so.

The Ship Captain's and Officers' Self-Instructor on Land or Sea.

By Captain R. S. Cogle. Liverpool: S. R. Gresson.

It is often our lot to see works which cause us to wonder what may be their *raison d'être*, and the book before us is of that order. In respect of the Storm Chart and its explanation, a fine opportunity has been lost of referring to the incurvature of the winds in a cyclone; the chart shows that this tendency towards the centre was frequent, and that the winds did not blow as if in circles returning on themselves. The navigation is very slipshod; in these days we hardly expected to see officers instructed to take the meridian altitude of the sun from $9^{\circ} 48'$ in order to get the zenith distance. The part indicating "how to keep ship's accounts in proper order" will be useful to an inexperienced man. Parts of the "letter of instructions" are good, other parts questionable; for example, the deduction of "two-pence per dollar above the rate of exchange." It is possible, however, that to some persons indifferent instructions may be better than none.

Technical Vocabulary. English—French. By Dr. F. J. Wershoven.

Librairie Hachette & Co. London: 18, King William Street, Strand. 1881.

In matters relating to physical, mechanical, and chemical sciences, machinery, railways, arts, and manufactures, in connection with their development in France and England, this handy little vocabulary will be very serviceable. It appears to be very complete, and brought up to the terminology of the most recent date.

MASTER'S AUTHORITY OVER PASSENGERS AT SEA.—It was our intention to publish an article on this subject in the present number, but the length to which our discussion of the important question of tonnage has run necessitates the postponement of our dealing with the subject of the master's authority over passengers at sea until next month.—(ED. N. M.)

CORRESPONDENCE.

FORM OF THE STORM AREA.

To the Editor of the "Nautical Magazine."

DEAR SIR,—The interesting paper on storms in your last issue has led me to think that a few more remarks on the same subject may be interesting to your readers.

The "Indraft" or "Spiral" theory is, I think, generally received now, but as far as my reading goes I have not seen any new theory respecting the *shape* of a storm brought forward in lieu of the circular form. I have been through four of these meteorological papers, and my observations lead me to the conclusion that the shape of the area of hurricane force in a revolving storm is elliptical, and that the centre is (as well as I can express it) the retarded focus of a progressing ellipse. I do not mean that the wind blows round an ellipse, only that the shape of storm area is an ellipse.

My reasons for arriving at this conclusion are as follows: I passed through two of these storms under nearly identical circumstances. They were both travelling about W.N.W.; both in the N. hemisphere; and the centre of each passed to the northward of our ship; both were travelling across an area over which a N.E. wind was blowing; and I found that in both cases the time from which the N.N.W. wind reached hurricane strength to the time it began to shift further, was about twice as long as the rest of the storm in passing over us. I was hove-to in both cases. Also in both storms all the dirty appearances and weather came beforehand, but as soon as the centre was past us we were back into fine weather in a very short time. My idea is, that when once a storm is going, and begins to travel over a space in which a local wind is blowing, it gathers strength and size *from* that wind, the point of low pressure at the focus of the storm drawing the air, with ever increasing speed, towards it; it seems possible that the direction of such local wind may *sometimes* influence the direction of the storm-track. I am also of opinion that, compared with the entire size of a storm area, fine weather is always very near the centre—in its rear; that in the narrow belt of storm, which parts the

centre from that fine weather, the greatest force of wind is likely to be experienced (in both of *these* storms it was from S.W.); and that in all the front part of such a storm (except near the centre) the wind is, roughly speaking, blowing from one direction. One fact, amongst others, from which I draw this reasoning is, that in a storm travelling to the westward, the centre of which passed to the southward of my ship, the wind began at N.—N.N.W. and *left us* at about N.E., and as far as I could gather from other data the centre passed comparatively near us.

Supposing my theory to be right, an Atlantic revolving storm would first be felt from S.S.E.—S.E., which, as far as my experience goes, is the most dangerous wind in that part of the ocean; but I can quite imagine that with a storm which has an E.N.Ely. track an E. wind (E.N.E.—E.S.E.) might be blowing directly towards the centre; and I am of opinion that in a part of *any* revolving storm, generally right in the track of and not far from the centre, the wind's direction is *less* than four points from the bearing of that centre. The other storm which I passed through bears out the same theory, but would require more space to discuss than you would care to give me. We passed through the right-hand semicircle very near the centre; it was travelling about N. We were at anchor at the Sandheads. I trust abler men may criticise this letter,

And remain, Sir, your obedient servant,

WILLIAM B. WHALL.

8, St. Julian's Road, Kilburn, October 9, 1881.

ICEBERGS AND FOG IN THE ATLANTIC.

To the Editor of the "Nautical Magazine."

SIR,—You were good enough to publish my letter on "Icebergs," under the signature of "An Atlantic Mail Steamship Master," in your July number. From some logs of passages, by two routes, across to Sandy Hook, which I have taken from the New York Maritime Register, I am convinced that the premises on which my argument was founded, in favour of a more southern route than the one now followed, are at least worth

examining. And here permit me, modestly to dissent from the tone of the letter on the same subject in your May number, the reading of which would lead an outsider to suppose that the masters left port at the commencement of a voyage with their hearts in their mouths, and were astonished on arriving at having been permitted to reach their destination.

Whatever your correspondent's feelings may be on leaving home, mine certainly are that a good ship, well found, and properly handled, is as certain to arrive as anything in this world; a rotten ship, improperly loaded, is as certain to go to the bottom or if negligently handled or carelessly navigated as sure to bring grief; for I hold that no weather can founder one of the class steamships in the North Atlantic trade, if they are properly loaded and handled. The only real danger is from fog or ice when the former is encountered, with the best seamanship in the world you are at the mercy of every negligent or inefficient officer who may have charge of the deck of a passing vessel. Whether that is an imaginary danger or not, the list of collisions, and the causes, annually published in the *Nautical Magazine*, will show. It therefore seems to me that a route where the minimum amount of fog is encountered, has claims for preference too strong to be overlooked, and the arguments in its favour, demand at least careful attention.

I do not claim to have discovered a new route for crossing the Atlantic; only to have continued going a more southern route each passage, as I found the number of miles of cold sea water (and therefore of fog) decreasing, until I succeeded in getting the fog altogether. Whether it requires more nerve to continue going farther south each passage (thereby each voyage lengthening the distance between your ports) until the limit of fog is reached than it does to continue steering through fog at the rate of ten or fifteen miles an hour, I leave for others to decide.

The nearest distance route to Sandy Hook, whether by the north of the Grand Bank or Cape Race is the same as that to the Henlopen as far west as the longitude of 67°.

I remain, Sir, very respectfully,

AN "ATLANTIC MAIL STEAMSHIP" MASTER

METHOD FOR FINDING LONGITUDE.

To the Editor of the "Nautical Magazine."

DEAR SIR,—Practical dead-reckoning has attained comparative perfection with our late improvements in compasses, leads, and logs, and thanks to Burdwood and Davis's "Azimuth Tables," the errors of the former are readily obtained. We have also correct and rapid means of working the ex-meridian problem for latitude, and Sumner's capital method of finding a ship's position. Any way of shortening the longitude problem should be acceptable, and I think, if it only obviates the necessity of going over the work a second time, it is some gain. It often happens, at sea, that on finding the latitude by noon sights, that the latitude used in working the a.m. sights for longitude is found considerably out (possibly twenty miles), and this so affects the longitude that it has to be worked over again.

The table, known as A and B table, published years ago in your columns, was a useful means of finding the amount of difference of longitude due to any such error of latitude, but it is not included in any epitome of navigation, and is seldom met with. For this reason I would suggest another plan which is dependent on the principle of the Sumner line of bearing, and being easily found with the azimuth (which all modern seamen are obliged to take for daily checking the deviation) is in everyone's hands.

The following is the method: With the azimuth as a course and 100 as distance, enter the traverse table, taking out the D. lat.—this represents the departure, and with the latitude of the place has only to be converted into difference of longitude in the usual way. This has to be divided by 100, or have two places of decimals struck off, and then is the difference of longitude corresponding to an error of one mile of latitude; thus the correct longitude is found at once by multiplying this amount by the number of miles the latitude is in error. It is applied, E. or W., according to the greater or less latitude and the sun's azimuth; no mistake can be made if it is remembered that it is, really, only the working out in figures, part of a "line of bearing," which is always at right angles to the sun's true bearing or azimuth. Till

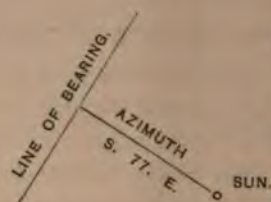
facility is obtained a figure would always make this clear.
an example :—

On April 25th, 1881, at 8.48 a.m., observations were taken the longitude worked out with lat. $33^{\circ} 14' N.$, D. R. At however, it was found that the correct lat. at time of sight lat. $32^{\circ} 55' N.$, a difference of 19 miles to the southward. azimuth was S. $77^{\circ} E.$ which taken as a course with 1 distance gave 22.5 in diff. lat. column : or 22.5 departure, to 27 diff. longitude in lat. 33° . This divided by 100 appears the error of longitude corresponding to each mile error of lat. The error of latitude in the example is 19 miles and it appears to

27 mile	Longitude by D. R. lat.	26° 18' E
19	Correction for 19' S. lat.	0 5 W
243	Correct longitude at sights	26 13 E
27		

5.13 miles

The Figure is



by which it is
seen that South
tude gives W
and vice versa.

I think a good explanation of this plan, which I have used several years, added to the introduction to the popular azimuth tables already mentioned, would be another addition to their usefulness, and a further help to practical navigation.

The plan is mathematically correct, where the error in latitude is limited to that of ordinary experience, say 20 or 30 miles

I am, dear Sir, your obedient servant,

Bhandara, September 20, 1881.

W. E.

[We insert the above inasmuch as we are glad to encourage discussion and the diffusion of information on the subject of celestial navigation, but as a matter of fact we may inform our correspondents that the problem and its corrections are already in Mr. Bock had something to say on the subject in 1872-3, as given in Rosser's "Self instructor in Navigation" and "The Watchman's Handy Book."—Ed. N. M.]

TIDE TABLES FOR NOVEMBER, 1881.

Also Ports of Reference for the Constants in the next Table.

WEEK. DAY.	MONTH.	LONDON BRIDGE.		HULL.		NORTH SHIELDS.		LEITH.		DEVON- PORT.		DOVER.		WESTON SUPER- MARE.		LIVER- POOL.		GREEN- OCK.		QUEENS- TOWN.		KINGS- TOWN.		LONDON- DERRY.		BREIST.		
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
Th	1	9 1	9 45	1 26	9 2	7 11	43 10	1 10 30	0 21	1 3	6 4	6 42	1 94	2 4	6 33	7 11	7 8	7 42	—	0 28	6 23	6 58	8 40	4 10	11 38	—	0 84	
W	2	10 20	10 55	2 56	3 8	—	0 13	7 11	35	1 41	3 15	7 18	7 50	3 41	4 22	8 16	8 40	8 47	1 4	1 37	7 29	7 59	4 36	4 50	0 3	0 84		
W	3	11 26	11 56	3 38	4 7	0 42	1 14	—	—	2 37	3 15	8 19	8 46	3 50	4 22	9 28	9 51	10 30	3 8	3 30	8 28	8 56	5 22	5 49	0 3	1 22		
F	4	—	0 29	4 82	4 55	1 31	1 54	0 25	0 40	3 41	4 1	9 12	9 50	4 51	5 18	9 28	9 51	10 34	3 51	3 27	9 22	9 43	6 8	6 31	1 53	2 16		
S	5	0 45	1 9	5 18	5 40	2 16	2 36	1 12	1 54	4 30	4 53	10 0	10 20	5 43	6 7	10 13	10 34	10 57	11 20	3 51	4 13	10 25	6 54	7 17	2 32	2 59		
M	6	1 31	1 53	6 9	6 24	3 56	3 16	1 55	3 15	5 37	10 46	11 9	6 59	6 50	10 55	11 16	11 42	—	4 35	4 57	10 45	11 5	7 38	7 57	3 30	3 41		
M	7	3 12	3 33	6 45	7 6	5 36	5 56	3 24	3 53	6 18	11 31	11 53	7 51	7 32	11 37	11 57	0 4	0 26	5 18	5 39	11 25	11 45	8 16	8 34	4 21	4 21		
W	8	3 52	3 13	7 26	7 45	6 16	6 36	3 12	3 53	6 16	6 53	—	—	0 17	0 47	1 7	1 46	1 27	1 46	6 19	—	0 5	8 52	9 10	4 46	4 50		
W	9	3 32	3 51	8 4	8 24	4 56	5 17	3 53	4 12	7 10	7 27	0 36	0 57	8 27	8 45	0 37	0 55	1 27	1 46	6 39	6 58	0 25	0 45	9 28	9 40	5 18	5 20	
W	10	4 14	4 29	8 48	9 3	5 57	5 57	4 32	4 58	7 44	8 1	1 18	1 33	9 3	9 20	1 14	1 33	2 5	2 24	7 17	7 35	1 7	1 28	10 50	10 26	5 58	6 15	
F	11	4 47	5 6	9 22	9 45	6 18	6 39	5 14	5 34	8 19	8 37	1 59	2 19	9 30	9 51	2 52	3 13	3 43	3 0	7 53	8 11	1 49	2 10	10 49	11 16	6 58	6 58	
S	12	5 25	5 48	10 4	10 28	7 2	7 27	5 58	6 22	8 57	9 19	2 39	3	10	10 25	3 31	3 53	3 30	3 42	8 32	8 54	2 31	3 54	11 46	—	7 50	7 43	
M	13	6 11	6 37	10 57	11 28	7 54	8 24	6 49	7 19	9 43	10 8	3 22	3 40	10 52	11 19	3 18	3 45	4 6	4 32	9 18	9 41	3 19	3 49	0 19	0 53	8 10	8 39	
M	14	7 2	7 31	—	0 1	8 57	9 33	7 51	8 25	10 36	11 8	4 12	4 40	11 50	—	4 15	4 50	5 0	5 30	10 14	10 46	4 21	4 54	1 33	2 11	9 10	9 44	
W	15	8 2	8 35	0 34	1 6	10 10	10 41	9 1	9 35	11 43	—	5 9	5 39	0 24	0 55	5 26	5 2	6 2	6 35	11 20	11 54	5 26	5 57	2 45	3 10	10 19	10 55	
W	16	9 14	9 53	1 37	2 8	—	0 12	11 5	11 31	1 29	2 9	7 14	7 44	2 37	3 8	7 41	8 9	8 13	8 41	1 0	1 30	7 57	7 54	4 36	4 57	0 1	0 29	
W	17	10 23	10 54	2 28	3 6	—	0 12	11 5	11 31	1 29	2 9	7 14	7 44	2 37	3 8	7 41	8 9	8 13	8 41	1 0	1 30	7 57	7 54	4 36	4 57	0 1	0 29	
F	18	11 21	11 46	3 33	3 58	0 28	1 11	11 54	—	2 30	2 57	8 11	8 34	3 37	4 8	8 19	8 55	9 7	9 32	1 58	2 23	8 30	8 44	5 17	5 30	0 55	1 18	
S	19	—	0 11	4 42	4 42	1 41	0 16	—	0 27	3 22	3 45	8 56	9 16	4 32	4 57	9 35	9 35	10 16	2 46	3 9	9 7	9 28	5 55	6 15	1 39	1 59		
M	20	0 31	0 51	5 2	5 23	2 0	2 19	0 56	1 16	4 8	4 30	9 40	10 2	5 21	5 44	9 52	10 15	10 36	10 58	3 32	3 53	9 48	10 7	6 35	6 56	2 19	2 39	
M	21	1 12	1 32	5 42	6 2	2 38	2 57	1 35	1 54	4 52	5 19	10 24	10 46	6 6	6 28	10 35	10 54	11 30	11 42	4 13	4 34	10 26	10 42	7 17	7 37	3 59	3 20	
W	22	2 12	2 13	6 23	6 44	3 16	3 36	2 14	2 34	5 34	5 52	11 3	11 36	—	—	0 4	0 4	0 4	0 4	5 56	6 18	11 41	11 25	7 37	8 16	3 41	4 9	
W	23	2 31	2 51	7 5	7 27	3 57	4 19	2 54	3 14	6 16	6 37	11 54	—	7 34	7 50	11 68	—	0 26	0 48	5 40	6 31	4 7	—	8 36	8 56	4 23	4 45	
W	24	3 12	3 34	7 49	8 11	4 42	5 5	3 36	3 56	6 58	7 20	0 18	0 42	8 18	8 36	6 20	0 43	1 10	1 33	6 26	6 49	0 36	9 17	9 39	5 7	5 29		
F	25	3 57	4 21	8 34	8 56	5 28	5 52	4 23	4 47	7 42	8 5	1 7	1 32	9 0	9 21	1 6	1 29	1 56	2 19	7 12	7 35	0 57	1 22	10 1	10 26	5 52	6 16	
S	26	4 43	5 9	9 22	9 47	6 17	6 43	5 12	5 36	8 59	9 53	1 57	2 32	9 42	10 3	1 22	2 10	2 42	3 8	7 68	8 22	1 47	2 18	10 53	11 24	6 41	7 8	
M	27	5 31	5 55	10 14	10 43	7 11	7 42	6 7	6 57	9 20	9 47	2 49	3 15	10 25	10 49	2 41	3 8	3 31	3 53	8 47	9 12	2 41	3 10	—	moon	7 36	8 4	
M	28	6 27	6 57	11 17	11 52	8 15	8 49	7 9	7 43	10 15	10 45	3 42	4 8	11 15	11 41	3 37	4 8	4 26	4 53	9 30	10 8	3 40	4 13	0 39	1 10	8 33	0 4	
W	29	7 37	8 1	—	0 25	9 24	10 1	8 18	8 54	11 17	11 52	4 36	5 2	—	—	0 46	4 42	5 19	5 25	6 7	10 41	11 17	4 55	5 21	2 39	9 38	10 16	
W	30	8 34	9 11	1 2	1 35	10 38	11 12	9 30	10 6	—	0 29	5 35	6 8	0 51	1 28	5 59	6 37	6 32	7 7	7 11	63	—	5 55	6 27	3 15	3 45	10 53	11 30

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

By applying the Tidal Constant of the place, according to its sign — sub.), to the time of high water on the given day at the port of reference have the time of high water at the place sought.

PLACE.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	P. RE.
	H. M.			H. M.	
Aberdeen	-1 17	Leith	Jersey (St. Helier)	+2 38	Brest
Aberystwyth	-3 53	Liverpool	Kinsale	-0 18	Queen
Alderney	+2 50	Brest	Lerwick (Shetland) ..	-3 47	Leith
Antwerp	+5 13	Dover	Limerick	+1 15	Queen
Arbroath	-0 43	Leith	Lisbon bar	-1 17	Brest
Arcachon	+0 50	Brest	Littlehampton	+0 24	Dover
Arklow	-2 25	Kingstown	Llanelly bar	-0 38	Westo
Ayr	-0 18	Greenock	Lowestoft	-4 1	Lond
Banff	-1 49	Leith	Lynn & Boston Deep ..	-0 29	Hull
Bantry harbour	-1 14	Queenstown	Margate	-2 18	Lond
Barstaple bridge	-0 26	Weston-s.-Marc	Maryport	+0 3	Liverp
Bayonne	-0 2	Brest	Milford Haven entr. ..	-0 63	Westo
Beachy head & Rye bay	+0 8	Dover	Montrose	-0 52	Leith
Beaumaris	-0 51	Liverpool	Morlaix	+1 6	Brest
Belfast	+2 42	Londonderry	Needles point	-1 26	Dover
Berwick	-1 5	N. Shields	Newcastle	+0 23	N. Shi
Blyth	-0 8	N. Shields	Newhaven	+0 39	Dover
Bordeaux	+3 3	Brest	Newport	+0 16	Westo
Boulogne	+0 13	Dover	Nienport	+1 6	Dover
Bridport	+0 22	Devonport	Nore	-1 28	Lond
Bristol & King Road ..	+0 19	Weston-s.-Marc	Orfordness	-2 43	Lond
Cadix	-2 2	Brest	Oporto	-1 17	Brest
Caernarvon	-1 56	Liverpool	Ostende	+1 13	Dover
Calais	+0 37	Dover	Padstow	-1 41	Westo
Campbellton	-0 23	Greenock	Peel, Isle of Man	-0 15	Liverp
Cardiff	+0 2	Weston-s.-Marc	Pembroke Dock	-0 43	Westo
Cardigan bar	-4 23	Liverpool	Penzance	-1 13	Devot
Carlisleford bar	-0 10	Kingstown	Peterhead	-1 45	Leith
Chatham	-0 47	London	Piel harbour, Barrow ..	-0 18	Liverp
Cherbourg	+4 2	Brest	Plymouth breakwater ..	-0 6	Devot
Coleraine	-1 37	Londonderry	Poole	-2 2	Dover
Coquet Road	-0 23	N. Shields	Port Carlisle	+0 47	Liverp
Cordonan Tower	-0 10	Brest	Portland breakwater ..	+1 18	Devot
Cowes (West)	-0 37	Dover	Port Patrick	-0 58	Green
Crinan	+4 41	Greenock	Portsmouth	-0 29	Dover
Cromarty	-3 21	Leith	Ramsgate	-2 19	Lond
Dartmouth	+0 33	Devonport	Rotterdam	+4 33	Dover
Deal & Downs	+0 3	Dover	Santander	-0 17	Brest
Dieppe	+7 19	Brest	Scarborough	+0 48	N. Shi
Donaghadee	+0 3	Kingstown	Selsea bill	+0 33	Dover
Donegal harbour	+0 17	Queenstown	Sheerness	-1 21	Lond
Douglas & Ramsay	-0 11	Liverpool	Shoreham	+0 22	Dover
Dublin bar	+0 2	Kingstown	Sligo bay	+0 17	Queen
Dundalk	-0 16	Kingstown	Sonthampton	-0 42	Dover
Dungeness	-0 27	Dover	Spurn point	-1 3	Hull
Dunkerque	+0 56	Dover	St. Ives	-2 10	Westo
Exmouth	+0 33	Devonport	St. Malo	+2 18	Brest
Falmouth	-0 46	Devonport	St. Mary (Scilly)	-1 16	Devon
Fecamp	+6 57	Brest	St. Nazaire	-0 7	Brest
Ferrol	-0 47	Brest	Stornoway	+6 38	Green
Flamborough head	-1 59	Hull	Stromness (Orkneys) ..	-5 17	Leith
Fleetwood	-0 12	Liverpool	Sunderland	-0 1	N. Shi
Folkestone	-0 5	Dover	Swansea bay	-0 53	Westo
Fowey	-0 29	Devonport	Tay bar	-0 11	Leith
Flushing	+1 42	Dover	Tees bar	+0 22	N. Shi
Galway bay	-0 25	Queenstown	Tenby	-1 12	Westo
Gibraltar	-1 27	Brest	Thurso	-5 49	Leith
Glasgow (Port)	+0 10	Greenock	Torbay	+0 17	Devon
Gloucester	+2 51	Weston-s.-Marc	Tralee bay	-0 58	Queen
Graunville	+2 26	Brest	Ushant (Ouessant)	-0 15	Brest
Gravesend	-0 48	London	Valentia harbour	-1 19	Queen
Grimsby (Great)	-0 53	Hull	Waterford	+0 13	Queen
Guernsey (St. Peter) ..	+2 50	Brest	Westport	-0 4	Queen
Hartlepool	+0 5	N. Shields	Wexford	+2 30	Queen
Harwich	-1 52	London	Whitby	+0 22	N. Shi
Havre	+6 4	Brest	Whitehaven	-0 9	Liverp
Helgoland	+0 21	Dover	Wick	-2 55	Leith
Holyhead	-1 13	Liverpool	Wicklow	-0 41	Kingst
Holy Island harbour ..	-0 53	N. Shields	Workington	-0 19	Liverp
Honfleur	+5 42	Brest	Yarmouth road	-4 43	Lond
Inverness	-1 59	Leith	Youghall	+0 13	Queen

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	PLACE.	SUBJECT.
372	ENGLAND—South Coast—Anvil Point	New light.
373	" East Coast—Harwich	Alteration of buoys.
374	" " Yarmouth District	Alteration of buoyage.
375	SCOTLAND—West Coast—Firth of Clyde—Skelmorlie Bank	Now a bell and gas buoy.
376	IRELAND—East Coast—Dublin Bay—Kish Bank Light-vessel	Alteration in position.
377	" S.E. Coast—Wexford South Bay—Rosslare Pier	Alteration in colour of light.
378	" " Wexford—Long Bank and Holdens Bed	Extension of bank.
379	NORTH SEA—Schouwen Bank	Proposed light-vessel and fog-signal, &c.
380	" Maas River—Bokke Gat Inner Light-vessel	Alteration in position.
381	" Zuider Zee—Amsterdam	Establishment of time-signal.
382	" Terschelling Bank Light-vessel	Alteration in position.
383	" Jade River—Schillighorn	Temporary light; old lights discontinued.
384	" " Aussen Jade Light-vessel	Alteration in position.
385	" Elbe River Approach—Scharhorn Shoal	Buoy to mark telegraph cable.
386	" Eider River Entrance—Inner Light-vessel	Alteration in position.
387	BALTIC ENTRANCE—Kattegat—Anholt Island	Permanent light now shown.
388	BALTIC—Sweden—Stockholm—Sodergrund Buoy	Altered in character.
389	" Gulf of Riga—Moon Sound	New light and fog-signal; old light altered.
390	" Gulf of Bothnia—Skelleftea Gasor Islet	New leading lights.
391	MEDITERRANEAN—Spain—Cartagena	Harbour light on Carra breakwater.
392	" Algeria—Cape Bengut	New light.
393	" Adriatic—Gulf of Trieste—Grado	New gas buoy; bell buoy withdrawn.
394	" Gulf of Volo—Volo Harbour	Torpedoes removed.
395	" Dardanelles	Night regulations strictly enforced.
396	INDIAN OCEAN—Madagascar—West Coast	Reported shoals.
397	CHINA SEA—Singapore Strait—South Channel—East Approach	Reported shoal.
398	EASTERN ARCHIPELAGO—Arafura Sea—Timor Laut	Reported reef.
399	JAPAN—Nipon—Tsuruga Bay—Tateishi-Mitsuki	New light.
400	GULF OF TARTARY—Saghalin Island—Dui (Duo) Lighthouse	Fog bell and gun.
401	RUSSIAN TARTARY—Peter the Great Bay—Vladivostok	Particulars of lights.
402	SOUTH AUSTRALIA—Spencer Gulf—Port Pirie	Tide gauge showing depth of water.
403	" " Franklin Harbour	New buoys and sailing directions.
404	" St. Vincent Gulf—Port Adelaide	New buoy.
405	AUSTRALIA—South Coast—Cape Otway	Red danger light below revolving light.
406	" " Port Phillip Entrance	Various changes in beacons and lights.
407	" Torres Strait—Prince of Wales Channel	Discovery of sunken rock.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.—*Continued*

No.	PLACE.	SUBJECT.
408	NEW ZEALAND—North Island—Cape Egmont	Position of lighthouse.
409	WEST INDIES—Jamaica—Kingston	New buoy.
410	UNITED STATES—Delaware Bay—Lewes	New leading lights.
411	" Delaware River—Horse-shoe Shoal and Fort Mifflin	New leading lights and fog-b
412	" Rhode Island—Block Island	Fog-signal altered.
413	" Massachusetts—Mount Hope Bay—Borden's Flats	New light and fog-signal.
414	ST. LAWRENCE GULF—Cape Breton Island—Louisburg	Position of automatic buoy.
415	CANADA—River St. Lawrence—Saguenay River Entrance—Lark Islet	New fog-signal.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

372.—ENGLAND.—*South Coast.*—*Light on Anvil Point.*—reference to Notice 301, p. 781, this light is now exhibited. It is a powerful *flashing white* light showing a flash *every ten seconds*, seaward between the bearings of S. 85° 30' E. and S. 77° 30' E. elevated 149 feet above high water, and visible from a distance of 18 miles. *Variation*, 19° W.

373.—ENGLAND.—*East Coast.*—*Approaches to Harwich.*—following alteration has been made in the buoyage:—

(1.) The North-East Bawdsey buoy has been moved 3 cables E. by N. $\frac{3}{4}$ N., to cover the shoal ground extending beyond the position of the buoy. The buoy now lies in $4\frac{1}{2}$ fathoms at low water spring tides, with the following marks and bearings, —North side of X Tower, touching south side of Bawdsey light tower, bearing W. by N. ; Shipwash light-vessel E. by N. (distant $1\frac{3}{10}$ ths mile); Orford high lighthouse N. by E. (distant $3\frac{3}{10}$ ths miles). *Variation*, 17 $\frac{1}{2}$ ° W.

(2.) The following alterations will also shortly be made in the buoyage:—A new buoy to be called the South Middle Shipwash will be placed midway between the South-West Shipwash and the Middle Shipwash buoys, to cover the knuckle in the sand.

the Swin Spitway buoy (Thames river entrance) will be moved $1\frac{1}{2}$ cable E. $\frac{1}{2}$ N. of its present position. Further notice will be issued.

374.—ENGLAND.—*East Coast.*—*Yarmouth District.*—*Alteration of Buoyage.*—With reference to Notice, No. 338, p. 810, the following alterations have been made :—

(1.) The *East Newcombe buoy* has been moved $2\frac{3}{4}$ cables S.W. $\frac{1}{2}$ W., and now lies in 7 fathoms at low water spring tides, with the following marks and bearings, viz. :—The red tiled Warren house in line with the northernmost of two Telegraph houses on Lowestoftness, N. $\frac{1}{2}$ W.; Lowestoft church, its length northward of the Wesleyan Church spire, N. by W. $\frac{3}{4}$ W.; Pakefield mill, on with the north side of a large house on the cliff southward of Pakefield (Colonel Perkins' house), W. by N. $\frac{3}{4}$ N.; S.E. Newcombe buoy, S.W. $\frac{3}{4}$ S. (distant $1\frac{1}{10}$ ths mile); South Holm buoy, N.E. $\frac{1}{2}$ N. (distant $\frac{1}{10}$ ths of a mile); S.W. Holm buoy, N.N.E. (distant $\frac{1}{10}$ ths of a mile); N.E. Newcombe buoy, N. $\frac{3}{4}$ E. (distant $\frac{9}{10}$ ths of a mile.)

(2.) The *Scroby South Hook buoy* has been discontinued.

(3.) The *South Scroby buoy* has been moved N. $\frac{1}{2}$ W. 4 cables, and now lies in $6\frac{1}{2}$ fathoms at low water spring tides, with the following marks and bearings, viz. :—The Trinity look-out at Yarmouth, its length westward of the Militia barracks, N.N.W. $\frac{1}{2}$ W.; Gorleston church, twice its length to the northward of the north pier head at Yarmouth haven, N.W. $\frac{1}{2}$ N.; Kessingland church, open westward of Lowestoft low light cottages, S.W. $\frac{1}{2}$ S.; Corton light-vessel, S. by E. (distant $1\frac{1}{10}$ ths mile); S.E. Corton buoy, W.S.W. (distant $\frac{1}{10}$ ths of a mile); N.E. Corton buoy, N.W. $\frac{1}{2}$ N. (distant $\frac{1}{10}$ ths of a mile); North Corton buoy, N.N.W. (distant $1\frac{9}{10}$ ths mile); St. Nicholas light-vessel, N. by W. $\frac{1}{2}$ W. W^{by}. (distant $2\frac{1}{10}$ ths miles); South Cross Sand buoy, N.E. by E. $\frac{3}{4}$ E. (distant $2\frac{3}{10}$ ths miles).

(4.) The *South-East and North-West Corton buoys* have been altered to can buoys, as in 1878.

(5.) The *North Scroby buoy* has been moved N.N.E. $1\frac{1}{2}$ cable, and now lies in $7\frac{1}{2}$ fathoms at low water spring tides, with the following marks and bearings, viz. :—Winterton church, just open northward of the lighthouse cottages, N.W. $\frac{1}{2}$ W.; Ormsby

church (St. Margaret's), just open southward of Scratchby l W. $\frac{3}{4}$ S.; the northernmost mill on Yarmouth denes, just eastward of Lacon's brewery building, S.W. $\frac{1}{4}$ S.; N.W. l buoy, S.S.W. Wly. (distant $1\frac{1}{2}$ mile); Cockle light-S.W. by W. (distant $\frac{1}{2}$ of a mile); N.E. Cockle buoy, N.W. (distant $\frac{3}{10}$ ths of a mile).

(6.) *The Cockle Knoll buoy* has been discontinued.

(7.) *The South Haisboro' buoy* has been moved S.E. by 1 mile, and now lies in 10 fathoms at low water spring tides the following marks and bearings, viz.:—Haisboro' low light twice its length northward of Ruston mill, W. $\frac{3}{4}$ N.; Palling out, its length northward of two large clumps of trees (there are midway between Ingham church and three miles to southward), W. $\frac{1}{2}$ S. Wly; Winterton mill, nearly on between the lighthouse and look-out (the mill is rather near the lighthouse), S.W. $\frac{3}{4}$ W.; Hammond's Knoll buoy, S. E. $\frac{3}{4}$ E. (distant $3\frac{1}{10}$ ths miles); Newarp light-vessel, S. (distant 6 miles); S.W. Haisboro' buoy, N.W. by W. (distant $1\frac{1}{2}$ mile); East Haisboro' buoy, N.N.W. (distant $5\frac{1}{10}$ ths miles); Would light-vessel, W. $\frac{1}{2}$ S. Wly. (distant 2 miles).

(8.) *Depths in Channels.*—The following alterations have place in the undermentioned channels in the vicinity of Yarmouth and Lowestoft roads:—Covehithe channel deepened to 18 feet; Stanford channel deepened to 20 feet; Hewett channel deepened to 24 feet; Corton gateway lessened to 15 feet.

375.—SCOTLAND.—*West Coast.*—*Firth of Clyde.*—*Skelton Bank Buoy.*—*Alteration in Character.*—This buoy has been replaced by a bell buoy, painted red, and lighted by gas.

376.—IRELAND.—*East Coast.*—*Dublin Bay.*—*Kish Bank Light Vessel.*—*Alteration in position.*—With reference to Notice No. p. 642, the alteration has been made as indicated.

377.—IRELAND.—*South-East Coast.*—*Wexford, South I Rosslare Pier Light.*—*Intended Alteration in Colour.*—Receiving harbour pier, Wexford south bay, being so far completed to receive vessels alongside, the following alteration will be made on 1st November, 1881, in the colour of the light exhibited from its outer extremity:—The fixed white light will be discontinued.

and in place thereof a *fixed green* light will be exhibited, elevated 32 feet above high water, and should be seen from a distance of 6 miles. This light will be visible in the South Shear through an arc of 8° , between Long Bank south buoy and Cawmeens (or Calmines), from the bearing of N.W. by W. $\frac{1}{4}$ W. to N.W. $\frac{1}{2}$ W. In the North Shear (between Long and Dogger banks) it will be visible through an arc of 17° , or between the bearings of S.S.W. $\frac{1}{2}$ W. and S.W.

Note.—The wooden structure of the pier extends 27 yards in a N.N. Westerly direction from the light. *Variation*, $21\frac{3}{4}^{\circ}$ W.

378.—IRELAND.—*South-East Coast.*—*Wexford South Bay.*—*Extension of Long Bank and Holdens Bed.*—It has been recently ascertained that the south end of Long bank (Holdens Bed), Wexford South bay, has extended in a S.S.W. direction for a distance of 5 cables.

Caution.—Vessels therefore entering Wexford South bay by the South Shear should keep Rosslare coast-guard station open northward of the southern peak of the South fall of Forth mountain bearing N.W. $\frac{1}{2}$ W., until abreast of Rosslare pier lighthouse. Vessels passing between South Long bank and Holdens Bed buoys will cross this shoal ground. *Variation*, $21\frac{3}{4}^{\circ}$ W.

379.—NORTH SEA.—*Schouwen Bank.*—*Proposed Light-Vessel with Fog-Signal, and withdrawal of Bell Beacon Vessel.*—It is proposed, during September or October, 1881, to place a light-vessel on the inshore edge of Schouwen bank, about 2 cables south-east of the present bell beacon vessel, which will then be withdrawn. The light will be *triple-flashing*, showing *three* white flashes in quick succession *every half minute*, elevated 36 feet above the sea, and visible from a distance of 11 miles. A riding light will also be shown. The light-vessel (composite wood and iron), painted red with broad white streak, and having the word *Schouwenbank* in black letters on her sides, will be moored in $13\frac{1}{2}$ fathoms water. The light apparatus will be on the mainmast; by day a black ball will be carried at the mast-head; the vessel will also have a jigger mast. Position, lat. $51^{\circ} 46' 55''$ N., long. $3^{\circ} 26' 0''$ E. In order to mark this position, two *watch* buoys, painted red with white band, and the letters (black) S. B. No. 1 and 2 on them respec-

tively, will be placed—No. 1 to the westward, distant one mile, 8½ fathoms water; No. 2 to the northward, distant 6 cables, in 8 fathoms water, from the moorings of the light-vessel.

Note.—When from any cause the flashing light cannot be exhibited, a fixed white lantern light will be shown from the mainmast-head, and a white flare every ten minutes from above the gunwale. When the light-vessel is not at her station, the usual lights will not be exhibited, but a fixed red light will be shown at each end of the vessel. By day a red flag will be hoisted above the black ball at the mast-head. Should a vessel be seen standing in danger, a gun will be fired, and repeated if necessary; also, the signal flags J. D. of the International Code “*You are in danger*” will be hoisted and kept flying until answered. A bright rocket immediately after a gun will denote that those on board require assistance from the shore.

A fog-signal will also be established on board the light-vessel. The signal will be a siren worked by a caloric engine, which during thick or foggy weather, will give three blasts in quick succession every two minutes. Should the siren be out of order or not immediately ready, the signal will be a bell, giving, as regularly as possible, three strokes in quick succession every half minute.

Note.—The narrow shoal, known as East Schouwen bank, over which the depth is 3½ to 5 fathoms, extends in a N.E. by E. and S.W. by W. direction, for a distance of 3 miles—the eastern edge lies N.E. by N. distant 2½ miles; and the western edge W. by N. distant one mile, from the proposed position of the light-vessel. All depths given are at ordinary low water. Variation, 16½° W.

380.—NORTH SEA.—*Maas River Entrance.*—*Bokke Gat Inner Light-vessel.*—*Alteration in Position.*—In consequence of alterations in the channel, Bokke Gat Inner light-vessel (North Pampus) has been moved about 4½ cables in an N.N.W. direction, and is now moored in 3½ fathoms water. Position, lat. 51° 51' 55" N. long. 4° 1' 5" E. Variation, 16½° W.

Note.—Vessels leaving the river may steer from the inner light-vessel to the outer light-vessel, passing midway between white buoy No. 5. and black buoy No. 4, but the outer light-vessel must be passed at a moderate distance. The southern edge of the

Ribben appears to have been washed away, and the channel in the inner part of the Bokke gat to have shifted considerably to the northward.

381.—NORTH SEA.—*Zuider Zee*.—*Time Signal at Amsterdam*.—Established on the tower of the new buildings of the School of Navigation situated at the angle of Prins Hendrikkade, and the Schippersgracht, Amsterdam. The signal apparatus, 102 feet above the ground, consists of four circular black discs of lattice work, $3\frac{1}{4}$ feet in diameter, on the arms of a horizontal cross, supported in the centre by a standard and connected with a moveable bar, by which the discs are moved. The signal is made once daily, as follows:—The discs are placed in a vertical position exactly five minutes before noon, and fall into a horizontal position at noon, local mean time—equivalent to $23^{\text{h}} 40^{\text{m}} 21^{\text{s}}$ Greenwich mean time. Position of time signal, lat. $52^{\circ} 22' 16''$ N., long. $4^{\circ} 54' 45''$ E.

382.—NORTH SEA.—*Terschelling Bank Light-Vessel*.—*Alteration in Position*.—On 20th September, 1881, on account of the heavy sea, Terschelling bank light-vessel was shifted S.S.W. $\frac{1}{2}$ W. a distance of 4 miles, and is now moored in 13 fathoms at low water. Position approximate, lat. $53^{\circ} 29'$ N., long. $4^{\circ} 58'$ E. Further notice will be given of the exact position of the vessel, also of the shifting of the two watch buoys. Variation, $15\frac{1}{4}^{\circ}$ W.

383.—NORTH SEA.—*Jade River Entrance*.—*Schillighörn*.—*Intended Discontinuance of Lights, and Exhibition of Temporary Light*.—The position of the lighthouse at Schillighörn, west side of Jade river entrance, will be altered during the winter 1881-1882; and consequently the two lights now exhibited therefrom, would be discontinued on 15th October, 1881. Pending the completion of the new lighthouse, a temporary light will be exhibited from the angle of the sea wall at Schillighörn; it will be a *fixed red* light, elevated about 23 feet above high water, and visible between the bearings of S. by E. (through west) and N.N.W. from a distance of 5 miles. Position, lat. $53^{\circ} 42' 20''$ N., long. $8^{\circ} 1' 30''$ E. Variation, $14\frac{1}{4}^{\circ}$ W.

384.—NORTH SEA.—*Jade River Entrance*.—*Aussen Jade Light-Vessel*.—*Alteration in Position*.—Consequent on change in the direction of the channel, the vessel has been moved $5\frac{1}{2}$ cables S.E.

noster Islet.—Exhibited from a lighthouse (constructed of iron) erected on the north-east point of Paternoster (Varilaid or Kire-laid) islet, western shore of Möön sound. It is a *fixed white and red light* with flashes, thus, *three red flashes*, followed by an eclipse of *two seconds* duration, between the bearings of N. 5° W. (through west) and S. 12° E.; and *one white flash every second* in all other directions—the light remaining visible between the flashes; it is elevated 46 feet above the sea (36 feet above the ground), and should be visible from a distance of about 12 miles. Position, lat. 58° 32' 50" N., long. 23° 27' 30" E. A *fog-signal* is also established at Paternoster islet lighthouse; it is a bell, which, during thick or foggy weather, will be sounded at long intervals.

(2.) *Werder Islet Light*.—The following alteration has been made in the character of this light, eastern shore of Möön sound. The fixed white and red light is discontinued, and in lieu thereof a *fixed white light* is exhibited, visible between the bearings of N. 11° W. (through east) and S. 37° E. Variation, 5° W.

390.—BALTIC.—*Gulf of Bothnia*.—Sweden.—*Skellefteå*.—*Leading Lights on Gäsör Islet*.—Two leading lights are exhibited on Gäsör islet, approach to Skellefteå. The outer light shows a *flashing white light* with *two flashes* through an arc of 63°, between the bearings of S. 38° W. and N. 79° W.—a *fixed white light* through an arc of 12°, between the bearings of N. 79° W. and N. 67° W.—a *flashing white light* with *one flash* through an arc of 43°, between the bearings of N. 67° W. and N. 24° W.—and a *fixed white light* of less intensity in all other directions. Position approximate on chart, lat. 64° 40' 0" N., long. 21° 20' 30" E. The inner light is a *fixed white light* of less power, situated at 73 yards westward of the outer light, and kept in line with it, leads clear of all shoals between Olsgrund and Rönnskäret, into Scheeren channel. These lights should be visible from a distance of about 12 miles. Variation, 6½° W.

391.—MEDITERRANEAN.—*Spain*.—*Cartagena*.—*Harbour Light on Curra Breakwater*.—In order to mark the more advanced portion of Curra breakwater, in course of construction in Cartagena harbour, a light is provisionally exhibited from its extremity, 842

yards from the eastern shore of the harbour. The light (shown from an ordinary lantern on a post) is *fixed green*, visible through an arc of 270° , or between the bearings of W. by N. $\frac{1}{2}$ N. and S. by W. $\frac{1}{2}$ W.; elevated 21 feet above the sea, and should be seen from a distance of about 2 miles. *Variation*, $16\frac{1}{4}^{\circ}$ W.

392.—MEDITERRANEAN.—*Algeria*.—*Light on Cape Bengut*.—Exhibited from a lighthouse recently erected on cape Bengut, near Dellys. It is a *fixed white* light, elevated 208 feet above the sea (95 feet above the ground), and visible from a distance of 25 miles. The lighthouse, square in shape and constructed of masonry, with a detached building, bears N. 74° W. from the extremity of Dellys point, distant about $1\frac{1}{3}$ mile. Position approximate on Admiralty Chart, lat. $36^{\circ} 55' 30''$ N., long. $3^{\circ} 53' 30''$ E., but by the French notice, long. $3^{\circ} 56'$ E. *Variation*, $14\frac{1}{2}^{\circ}$ W.

393.—MEDITERRANEAN.—*Adriatic*.—*Gulf of Trieste*.—*Buoy Lighted by Gas near Grado*.—*Bell Buoy Withdrawn*.—A buoy lighted by gas (Pintsch system) has been placed experimentally, seaward of Mula di Muggia bank, near Grado; and the bell buoy which previously marked the edge of the bank, is withdrawn. The gas buoy is surmounted by a *fixed white* light, elevated 13 feet above the sea, and moored in 6 fathoms water, with the following bearings, viz.:—Grado church steeple, N.W. $\frac{3}{4}$ N.; Barbara church, N.; Duino castle, N.E. $\frac{3}{4}$ E.; Salvore point lighthouse, S. *Variation*, 11° W.

394.—MEDITERRANEAN.—*Gulf of Volo*.—*Volo Harbour*.—*Torpedoes Removed*.—The entrance to Volo harbour is now free from obstruction—the torpedoes, with the exception of four which could not be recovered, having been taken up. These four torpedoes cannot explode without communication with the electric battery, which has been cut off.

395.—MEDITERRANEAN.—*Dardanelles*.—*Regulations Prohibiting Passage at Night Strictly Enforced*.—With reference to previous Notice on the regulation prohibiting vessels from passing up the Dardanelles during the night, and as to vessels attempting to infringe this regulation having been fired at with shotted guns, vessels approaching forts Namazieh and Sultania Kaleh (Chanak-Kalessi) with the apparent intention of entering the Narrows, wil

be warned by the burning of a blue light on the forts, and by the successive discharge of three blank shots; and on these admonitions proving fruitless, shotted guns will be fired. After the usual warning, the regulation is peremptory to fire into any vessel disregarding it. The lower part of the strait is free, but the entrance into the Narrows between sunset and sunrise is absolutely forbidden under any circumstances. The Narrows begin at forts Namazieh on the European, and Chanak Kalesi on the Asiatic side.

Note.—Although pratique is granted by the Health offices established below the Narrows, the pratique thus obtained does not authorise vessels to enter the Narrows during prohibited hours.

396.—INDIAN OCEAN.—*Madagascar.*—*West Coast.*—(1.) *Reported Shoal Westward of Mourondava.*—Over this shoal (*Macé shoal*), lying about 8 miles W.S.W. from Mourondava, there is said to be only a depth of 6 feet. Position approximate on chart, lat. $20^{\circ} 23' 30''$ S., long. $44^{\circ} 11' 0''$ E.

(2.) *Shoal in Approach to Great Road, Nos Beh.*—A coral bank with 2 fathoms at low water (*Héloise shoal*), lies in the southern entrance to Great road, Nos Beh, midway between Tani-Kéli islet and Nos Cumba, with the north and north-west extremes of Nos Cumba in line. Position approximate on chart, lat. $18^{\circ} 27' 0''$ S., long. $48^{\circ} 16' 30''$ E. Variation, $16\frac{1}{2}^{\circ}$ W.

397.—CHINA SEA.—*Singapore Strait.*—*South Channel, Eastern Approach.*—*Reported Shoal.*—Information has been received of the reported existence of a shoal, lying about 5 miles northward of Tanjong Brakit. The position of this danger (*Hansa shoal*), on which the German ship *Hansa* is reported to have struck, is described as follows by the master of that vessel:—The *Hansa* had proceeded on a W.N.W. course for a few minutes after the following bearings were taken, when she struck (afterwards foundering):—Pulo Brakit, S.S.W.; Horsburgh lighthouse, W. $\frac{1}{2}$ N. Soundings of 5, 8 and 13 fathoms were obtained near the shoal by the ship after getting afloat. Position approximate, lat. $1^{\circ} 18' 30''$ N., long. $104^{\circ} 35' 45''$ E.

Note.—This shoal has been unsuccessfully searched for by the German vessel of war *Freyja*—its position therefore must be considered doubtful.

gauge has been affixed to a pile (in 7 feet at low water springs) at the entrance of the channel leading to port Pirie. This gauge shows the depth of water (mid channel) between the black and red buoys at the inner bar; it bears about N.E. $\frac{1}{2}$ N. from the fairway chequered buoy, from which it is distant nearly $1\frac{3}{4}$ cable.

403.—SOUTH AUSTRALIA.—*Spencer Gulf.*—*Franklin Harbour.*—The channel leading into deep water south of Entrance island, Franklin harbour, is now marked by six buoys placed in position. *Sailing Directions*:—Get Victoria point to bear north, run in until the fairway red and black chequered buoy is observed (it is tub-shaped, surmounted by staff and ball, and moored on the edge of a patch having $1\frac{3}{4}$ fathoms over it at low water), and leave it on the starboard hand, when a course of N.N.W. $\frac{1}{2}$ W. will lead half-way between two buoys about half-a-mile distant from the chequered buoy—one red on the starboard hand, the other black on the port hand; when near them, the remaining buoys marking the channel into deep water south of Entrance island will easily be recognised.

404.—SOUTH AUSTRALIA.—*Gulf of St. Vincent, Port Adelaide.*—A cheese-shaped buoy, surmounted by triangular lattice framework and ball, painted white, has been moored in the Gulf of St. Vincent, in $7\frac{1}{2}$ fathoms at low water, on a bearing of N.W. by W. $\frac{3}{4}$ W. from Port Adelaide lighthouse. This buoy has been laid down as a guide for the discharge of silt raised in connection with the deepening operations at this port.

405.—AUSTRALIA.—*South Coast.*—*Cape Otway Lighthouse.*—*Red Light Exhibited.*—A red danger light is now exhibited from Cape Otway lighthouse, 48 feet below the revolving light. The red light is so screened as to be obscured when approaching from seaward, until 4 miles distant, on a N. by W. bearing; and will be visible (in clear weather) to a vessel proceeding on a W. by S. or E. by N. course, until ran out of sight at 8 miles distant.

Note.—This red light is exhibited to warn mariners of approaching danger, and when seen, a vessel should alter course to run it out of sight. In thick or foggy weather mariners should not rely on sighting the red light, but should keep a good offing.

406.—AUSTRALIA.—*Port Phillip Entrance.*—(1.) *Deep Water*

bay. The apparatus lights 90° of the horizon, and the focal plane is 100 feet above the ground and 108 feet above mean low water. The light should be seen from a distance of 16 nautical miles. The structure is a black framework of iron, with a drab dwelling attached. The range-line between the two lights runs E. $\frac{1}{2}$ N. and W. $\frac{1}{2}$ S., and vessels entering must not pass to the north of it until Cape May light bears N.N.W. Approximate position, lat. $38^\circ 47' 18''$ N., long. $75^\circ 10' 6''$ W.

411.—UNITED STATES.—*Delaware River*.—(1.) *Horseshoe Shoal*.—*Leading Lights*.—Two groups of leading lights are exhibited to aid vessels in passing through Horseshoe bend, Delaware river. Each group consists of three lights—a rear light, *fixed white*, shown from a detached tower of open frame-work; and two front lights, one *fixed white* and the other *fixed red*, shown from small frame structures, 10 feet high, corresponding in colour to the colour of the lights. The first (or lower) group is on Fort Mifflin Reservation, about half a mile above the fort. The second (or upper) group is in Howell cove, on the south bank of the river, about 2 miles below Gloucester. The rear light of Fort Mifflin group, with its *white* front light, forms a range to mark the channel passing League island. Vessels proceeding up the river pass directly from Fort Mifflin cut range to this range, and should hold it to the *lower turning point*, which is where the lower or *red* front light of Howell cove group is in line with the rear light of that group—at this point the course must be altered three points to port. The rear light of Howell cove group, with its *white* or upper front light, forms a range marking the channel from opposite Greenwich point to the *upper turning point*, which is where the upper, or *red*, front light of Fort Mifflin group is in line with its rear light—at this intersection, vessels proceeding down the river should alter course three points to starboard. The distance between these turning points—about five-eighths of a mile—is without leading marks.

(2.) *Fort Mifflin*.—*Discontinuance of Light, and Alteration in Position of Fog-Bell*.—On the exhibition of the above-mentioned lights, the light previously shown on the pier opposite Fort Mifflin, would be discontinued; and the fog-bell at that structure would

OUR OFFICIAL LOG.

OFFICIAL INQUIRIES AT HOME.

1095. *Mary E. Ray*, barque ; built at Littlehampton, 1860 ; owned by the Phoenix Shipping Company ; tonnage, 458 ; Cardiff to Bahia ; coals ; stranded near Breaksea Point, August 16, 1881. Inquiry held at Cardiff, September 2, 1881, before Jones, Judge ; French and Anderson, N.A. Stranding caused by negligent navigation on the part of both master and mate. Certificates suspended for six months.

1096. *Standard Bearer*, barque ; built at Barnstaple, 1871 ; owned by Mr. E. Burgess ; tonnage, 511 ; Swansea to Coquimbo ; coals ; abandoned at sea, June 5, 1881. Inquiry held at Swansea, September 5, 1881, before Fowler, Judge ; Parfitt and Hyde, N.A. Abandonment premature, for which the mate was to blame, who sided with the crew, against the master, in pressing him to leave the vessel. Mate's certificate suspended for three months.

1097. *Dania*, s.s., and *Abana*, s.s. ; the former built at West Hartlepool, 1871 ; owned by Mr. W. Gray and others ; tonnage, 959 ; Pomeroy to the Tyne ; sulphur ore ; the latter built at Sunderland, 1871 ; owned by Mr. J. Westall and others ; tonnage, 719 ; the Tyne to Dunquerque ; coals ; in collision in the river Tyne, August 11, 1881, when the *Dania* foundered. Inquiry held at North Shields, August 31, 1881, before Baker and Swan, Justices ; Pickard, Beasley and Methven, N.A. Collision caused by the steam steering gear of the *Abana* failing to act ; and from the *Dania* being to the southward of mid-channel, contrary to the bye-laws. Both vessels were in charge of pilots.

1098. *Columbine*, s.s. ; built at Hull, 1866 ; owned by Mr. J. Dyson and others ; tonnage, 498 ; the Humber to Cronstadt ; lost on the Horn Reef, Jutland, August 10, 1881 ; when loss of life ensued. Inquiry held at Hull, September 8, 1881, before Twiss, Judge ; Forster, Ward, and Hallett, N.A. Master in default for negligent navigation. Certificate suspended for six months.

1105. *Dunmore*, s.s. ; built at Dalnair, 1878 ; owned by

Mr. G. J. Kidston; tonnage, 594; employed trading Glasgow, Ireland, and Plymouth; general cargo and passengers stranded on Ballyquinton Point, Co. Down, August 24. Inquiry held at Glasgow, September 15, 1881, before Swan, Justices; Murdoch and Clarke, N.A. Casualty neglect of the lead. Master severely reprimanded, and cautioned to be more careful in future.

1112. *Amcott*, s.s.; built at Hartlepool, 1872; owned by Mr. E. H. Capper; tonnage, 654; Newcastle to Elsinore, stranded on the Lavergrund Shoal, near Faro Island, Baltic, June 7, 1881. Inquiry held at Westminster, September 30, 1881, before Rothery, Wreck Commissioner; Higginbotham, N.A. Master and mate both to blame, the former for keeping the ship too long on an easterly course and the latter for reporting a light to the master without ascertaining what light it was. Certificates suspended for six months, respectively.

1115. *Stratheden*, barque; built at Tayport, Fife, 1872; owned by Mr. W. Thomson and others; tonnage, 408; Leith to Ayres; coals; lost on the Middle Cross Sand, August 25. Inquiry held at Dundee, October 1, 1881, before Macdonald, Justices; C. Y. Ward, and G. W. Ward, N.A. Master and mate both to blame for negligent navigation. Certificates suspended for three months.

OFFICIAL INQUIRIES ABROAD.

1099. *Gordonia*, s.s.; stranded on Hittarp Reef, August 24, 1881. Naval Court held at Copenhagen, August 24, 1881. Accident due to the master not making due allowance for strong current. Warned to be more cautious in future.

1100. *America*, s.s.; lost on an Island of the Hydrographic Group, June 27, 1881. Naval Court held at Shanghai, July 1, 1881. Vessel went ashore in a dense fog. Master's certificate suspended.

1101. *Lakefield*, barque, and *Corina*, barque; in collision

Tristan d'Acunba, July 4, 1881. Inquiry held at Port Elizabeth, August 2, 1881. Collision accidental. Master's certificate returned.

1102. *Cyprus*, barque; put into Algoa Bay in consequence of injury to rudder and other damage. Damage caused by stress of weather. Master justified in seeking nearest port.

1103. *Clymping*, barque; lost at East London, July 25, 1881. Inquiry held at East London, August 1, 1881. Drove from her anchorage and went ashore in a heavy S.W. gale. Master on shore at the time. Mate lost his life.

1104. *Brighton*, barque; lost at East London, July 25, 1881. Inquiry held at East London, August 1, 1881. Parted her cables and went ashore in a heavy S.W. gale. Master on shore at the time.

1106. *Whinfell*, barque; abandoned at sea, June 6, 1881. Naval Court held at Valparaiso, July 30, 1881. Abandonment justifiable.

1107. *Argyle*, s.s.; lost through striking on a rock at the entrance of the Clarence River. Inquiry held at Sydney, July 25, 1881. No evidence on which to found a charge against the master.

1108. *Queen of Nations*, barque; lost near Wollongong, coast of New South Wales, May 31, 1881. Inquiry held at Sydney, June 23, 1881. Master to blame for careless navigation and drunkenness. Certificate suspended for twelve months.

1109. *Sophia*, schooner; lost when entering Sydney Harbour. Inquiry held at Sydney, July 25, 1881. Master free from blame.

1110. *Glenelg*, s.s.; grounded in Port Adelaide River. Inquiry held at Port Adelaide, August 10, 1881. Master exonerated.

1111. *Samson*, s.s.; lost at the entrance of the Waitara River, Taranaki, N.Z., July 23, 1881. Inquiry held at New Plymouth, N.Z., July 30, 1881. Accident due to an error of judgment on master's part.

1113. *Loch Rannoch*, s.s.; took fire whilst at sea, and afterwards became submerged in Bombay Harbour. Inquiry held at Bombay, August 6, 1881. Court considers that master took every

precaution for the safety of the vessel up to the time of her destruction, but displayed some want of energy after that period.

1114. *Southern Cross*, barque; took fire at sea, but ultimately reached Table Bay where she was scuttled, and abandoned on the 25, 1881. Inquiry held at Cape Town, September 15, 1881. Master free from blame. Certificate returned.

GENERAL.

CAPE BRETON ISLAND.—LOUISBURG.—The following information relating to the harbour of Louisburg, on the south-east point of Cape Breton Island, has been received from Mr. Kennelly, Harbour and Superintendent at the port (1881):—Louisburg harbour being largely used by steamers calling for coal; the pier, 33 feet water, is capable of accommodating the largest vessels, and special dispatch is given to steamers bunkering; the harbour is one of the finest in the world, being a natural basin having deep water throughout its whole extent. The entrance is about half-a-mile wide at its narrowest part; the average depth here being from 8 to 10 fathoms, and inside 6 to 8 fathoms there is a shoal patch having only 15 feet water, rocky bottom, in the middle of the harbour, abreast Battery point. The only shoal outside the entrance is the harbour shoal, on which the least depth is 21 feet (not 30 feet as given on Admiralty Chart, No. 1000). There are rocky shoals on the starboard-hand going in, but the reefs on the port-hand are bold and do not shoal; these reduce the width of the navigable channel to about a quarter of a mile. The Nag rock, on the starboard-side going in, is buoyed; immediately inshore of it, on Kennelly point, is a flagstaff.

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ON THE MASTER'S AUTHORITY OVER PASSENGERS
AT SEA.



It is highly to the credit of the masters of British ships that little is to be found in English law-books on the subject of their authority over passengers. Even Lord Stowell had a doubt in 1802, when a passenger was desirous of instituting a civil suit in the Admiralty Court for damages against the master of a British ship for assaulting him on the high seas, whether any sanction could be found in the pre-existing practice of the Court for entertaining such a suit (*The Ruckers*, 4 Ch. Robinson, p. 75). It was ascertained, however, upon due search in the Registry of the Admiralty Court, that there had been former instances of proceedings for damages by persons who were not connected with the master by any relation arising from official position on board the ship. Lord Stowell accordingly allowed the action to be instituted; the complainant, however, upon the publication of the evidence, declined to proceed to a hearing, and paid the costs of the suit. Since the case above mentioned there is no reported instance of proceedings in the English Admiralty Court for damages on the part of a passenger against the master of a ship, and as the complainant in the case of *The Ruckers* did not go to a hearing, there was no opportunity for Lord Stowell on that occasion to give

any exposition of the law applicable to the subject. Mr. Story, however, whose authority in Admiralty matters second to Lord Stowell's, had occasion in 1823 to assert Admiralty jurisdiction over such questions in the Circuit Court of the United States of America in the case of *Chamberlain v. others against Chandler* (3 Mason's Reports, p. 242). Justice Story had no doubts as to the jurisdiction of the Admiralty Court in such cases, inasmuch as the contract for the conveyance of passengers on the high seas is a maritime contract, and a breach of the conditions necessarily implied in such a contract would be a maritime wrong. It could make no difference, as observed, in point of principle whether the wrong be an injury and imprisonment, or a denial of reasonable comforts or necessities, for all of which the contract with the master of the ship implies a stipulation.

Such being the view of two eminent jurists, whose authority in adjudicating upon maritime questions ranks deservedly high, it is well worth while to ascertain whether the recorded Customs of the Sea, as handed down to us in various collections of "Ancient Laws," throw any light on the relations between the master and the passengers, as distinct from those between the master and the crew. The Rolls of Oleron, which embody the customs of the merchants and mariners engaged in the wine trade between the ports of Gascony and the ports of England and of Flanders, are totally silent on the subject of passengers. A similar silence has been observed throughout the Laws of Wisby, which have incorporated the Laws of Oleron with the customs observed by the mariners of the North Sea and of the Baltic. The practice would seem to have been unknown before the fourteenth century for any body of passengers, as distinct from merchants, to be carried on board of merchant ships, and the earliest collection of maritime customs which contain specific provisions on the subject of passengers, is of Mediterranean origin, and embodies the practice observed in vessels hailing from Spanish or Italian ports, and conveying pilgrims to the Holy Land. In fact the words "pilgrim" and "passenger" are identical in the "Consuetudines" in which the word "pelegri" is but the Catalan

the Latin "peregrini." The definition of a passenger in this ancient body of Sea Customs, which was probably drawn up in its complete form in the fourteenth century for the use of the Court of the Consuls of the Sea at Barcelona, is "every man who pays freight for his own person and for goods which are not merchandise," (chapter lxviii). The passenger, however, in those days occupied a very different position on board ship from what he does in the present day. The master of a ship in those days was only bound to find place and water for the passengers, and to convey them whither they had covenanted to be conveyed. They had to find their own bedding and their own provisions, and if they died in the course of the voyage their bedding and their provisions became the perquisite of the master of the ship. We have ourselves a lively recollection of being a youthful member of a party who took shipping some sixty years ago in a sailing packet from Hellevoetsluis to Harwich, on which occasion the party had to find their own provisions and their own Cognac for six days, such being the possible duration of the voyage, if the wind should have been adverse. Fortunately a favourable breeze sprang up as soon as we had got out to sea, and the voyage was accomplished within twenty-four hours, but success had its drawback, as the provisions and the Cognac became the perquisite of the master of the vessel, and the Cognac, which was in those days a rarity to Englishmen, was especially regretted by the party, who were not allowed to take it on shore with them.

If we had to confine our enquiry to proceedings in the Admiralty Courts of England and of the United States, we should have little to appeal to beyond the two cases above cited, but since the case of *The Ruckers*, British subjects who have conceived themselves to have been wronged as passengers in British merchant ships by acts either of commission or omission on the part of the master, have also conceived the idea, that they would find more sympathy from the jury of a Common Law Court than from the Judge of an Admiralty Court sitting alone to hear their complaint without the aid of a jury. Thus we find an action brought at *Nisi Prius* before Lord Ellenborough, Chief Justice of the King's Bench, in 1807, on the part of a

passenger, for assault and false imprisonment under some peculiar circumstances. In the course of this action Lord Ellenborough took occasion to state the general law on the subject of the master's authority. It appeared from the facts of the case that in the course of the homeward voyage of the *Huddart* Indianman, two strange sail supposed to be enemies hove in sight when the master mustered all hands on deck, and assigned every person his station. The plaintiff, with other passengers, was ordered on to the poop, where they were to fight with small arms. All readily obeyed the order except the plaintiff, who was in the gunners' mess, and conceived himself to have been ill-used by the master in being forbidden to walk on the poop, he accordingly refused positively to go there, but offered to fight in any other part of the ship with his messmates. The plaintiff, for this contumacy, was by the master's order carried on to the poop, and was there kept in irons during the whole night. Next morning no enemy was in sight, and the *Huddart* in due course arrived safely at St. Helena, where the plaintiff left her and paid £100 for his passage to England in another ship. There were two questions raised in this case, whether the special damage of the £100 passage money was so closely connected with the trespass as to be properly a subject for damages, upon which the learned Chief Justice seems to have ruled against the plaintiff. The second question was, whether the master had exceeded his authority, upon which Lord Ellenborough observed after the case had been opened, that the captain of a ship had authority to do what was necessary for the safety of those on board. On the approach of an enemy he had a right to assign to them all stations, which it was their duty to accept. As the plaintiff refused to obey the orders given to him, perhaps his confinement might be necessary to the discipline of the crew and the security of the vessel. However, when it came out in the course of the evidence that the plaintiff had been kept all night in irons on the poop, his Lordship held that the master had clearly exceeded the limits of his authority.*

* *Boyce v. Bayliffe* "Campbell's Reports," 1, p. 60.

Lord Ellentorouh's exposition of the master's authority in such a case is quite in accordance with the principle laid down in the *Consolato del Mare*.*

"This is what the passenger and everybody who sails on board a ship ought to do towards the master of a ship. He is bound to aid and to guard and to defend the ship, and not to abandon it until the end of the voyage, except with the consent of the master of the ship. And for this reason this chapter was made, for many masters of ships take on board mechanics and men-at-arms as passengers, and charge them a lower rate of freight than they would have done if they had known that they would leave the ship, and many merchants would not sail in the vessel except that they know that men-at-arms will go with her. Further, the passengers and all other persons who shall go in the ship, are bound to be present and to abide by the counsel and all the rules, which shall be laid down and established on board the ship" (chapter lxxviii.)

An American jurist, in treating of the power and duty of the master of a ship as to passengers, has observed that the master of a ship from the necessities of his employment must be clothed with almost despotic authority over all on board his ship, for the safety of all the persons and the property in the ship may depend on the preservation of discipline and on prompt obedience to every command.†

This is in perfect accordance with the summing up in 1858 of Baron Watson in the case of the *King v. Franklin*, 1 ; Foster and Finlason, "*Nisi Prius Reports*," p. 160 ; where the learned Baron says, "the captain has the absolute control over the passengers and crew. The contract with the passenger is to carry, board and lodge him, and the passenger is to obey all the captain's reasonable orders in an emergency, even to work the ship, if necessary. If a passenger misconduct himself at table, the captain may remove him, or may even imprison him for a short time, if imprisonment be necessary for the enforcement of his lawful commands. The rule of law is simple ; the power of the

* "*Black Book of the Admiralty*." Rolls Edition, Vol. III., p. 185.

† "*Parsons on the Law of Shipping*," Vol. I., p. 636. Boston, U.S., 1869.

ninety-nine days on board of his vessel. The judgment of the Court was delivered by Chief Justice Erle, who said that as long as the British vessel was within Chilian waters, the captain could justify his conduct as acting under the authority of the Chilian Government, but that as soon as the vessel left Chilian territory and was on the high seas all persons on board of her, whether foreign or British, were as much amenable to English law as they would be on English soil. The Court accordingly upheld the conviction on the ground that, although the captain was justified in receiving the prisoners whilst under Chilian jurisdiction, yet that the justification ceased when he passed outside the line of Chilian waters. As the only question before the Superior Court was the legality of the conviction upon the indictment in the Court below, it was sufficient for the Superior Court to declare that the master's authority to keep his passengers confined to their cabin under his contract with the Chilian Government ceased as soon as his vessel was beyond the jurisdictional waters of Chili, and that on the high seas no law but British law was operative on board of a British vessel. The principle that the law of the territory is paramount, if it conflicts with the law of the flag, in the case of a merchant ship lying within foreign waters, has been upheld by various decisions of English Courts of Law, so that the masters of British merchant ships should bear in mind, that what would be a perfectly lawful exercise of their authority on the high seas, may be unlawful on their part when they are within foreign waters, and the converse equally holds good as in the case of *Regina v. Lesley*.* Let us take the familiar instance of the *Calais-Douvres* passenger steamer, which carries the day-mails between Dover and Calais. Although British owned, she is chartered to the French Government, steams under the French flag, and has a French captain on board of her. She is for all intents and purposes subject to French law as the law of her flag on the high seas, but when she enters British waters she becomes

* *Regina v. Anderson* (1 Law Reports, Crown Cases Reserved, p. 161), is a case where British Law was held to be concurrent with French Law in an instance of manslaughter committed on board of a British ship in French territorial waters.

conducts himself in such a manner, as to cause annoyance to other passengers on board, and if such person is on board, may put him on shore in any convenient place, and no person so refused admittance or put on shore shall be entitled to the return of any fare he may have paid." It may be conjectured that the motive of the Legislature in limiting this provision to home trade passenger steamships, that is to British steamships trading within the following limits: the United Kingdom, the Channel Islands, and the Isle of Man, and the continent of Europe between the River Elbe and Brest inclusive, was a fear of imposing too severe a penalty upon a passenger so misconducting himself, if he should be landed in a foreign country at too great a distance from his destination, but there seems no good reason why the same provision should not be extended to home trade sailing vessels, or why a passenger so misconducting himself on board a sailing vessel should not be barred from recovering any portion of his fare, if the captain should find it necessary to put him ashore.

It has been observed by the captain of a large mail and passenger steamship belonging to Messrs. Donald Currie and Co.'s Colonial Mail Line of Steamers* that "the Passengers' Acts" lay down certain rules to be observed by the owner of a ship and the captain, who, if they fail to carry them out, are visited with heavy fines and penalties, but nothing is guaranteed as to the good conduct of the passenger while on board. The observation is pertinent as regards the silence of the Passenger Acts, for the statute, which we have just cited, is not strictly speaking a Passenger Act, and if books are sent on board steam vessels for the guidance of the officers, which contain the Passenger Acts and notices to passengers, it might be as well for all parties that article 325 of the Merchant Shipping Act, 1854,† should find a place in such books, although it is limited in its full application to home trade passenger steamships. Further there are certain provisions in the Merchant Shipping Act Amendment

* Letter of Captain Edward Jones, R.N.R., of the Royal Mail Steamship, *Grantully Castle*, in the *Nautical Magazine* of October last, p. 802.

† 17 and 18 Vict., ch. 104, sec. 325.

Act, 1862,† with regard to misconduct by passengers in steam which might properly find a place in any manual prepared for guidance of the officers of steam vessels. But the captain of *Grantully Castle* has misinterpreted the silence of the Passenger Acts when he goes on to say that "a passenger may with impunity get drunk, use obscene language, assault fellow-passengers, and make himself generally obnoxious." The danger of legislating on the subject of the master's authority is obvious. Its present absolute character in point of principle may be at risk being brought into question by a misapplication of the maxim that "express words are words of limitation." It is to be observed that many Acts of the Legislature recorded in the Statute Book have not created the offence which has been already a misdemeanour at Common Law, but have been intended to regulate the penalty, in some cases making it more severe, and henceforth limiting the discretion of the magistrate to inflict a less penalty. But the circumstances under which the captain may be called upon to exert his authority on board ship are so various, and the necessity for its unlimited exercise may be so peremptory, that while it would be undesirable to lay down an inflexible rule of severity, it would be dangerous to fetter the captain's discretion in any way by precise legislation. Chief Justice Tindal has plainly laid down in the case of *Prendergast v. Compton*, already cited, "conduct unbecoming a gentleman in the strict sense of the word may warrant a captain in excluding a passenger from the table where the other passengers mess," whilst Baron Watson in the case of the *King v. Franklin*, also cited above, has ruled, that "if a passenger misconducts himself at table, the captain may restrain him or even may imprison him for a short time, if imprisonment be necessary for the enforcement of his lawful command." It is obvious therefore that there is no need of legislation to authorize the captain to protect the passengers at large from the nuisance of a fellow-passenger's conduct, if his conduct be bad and of the character described by the captain of the *Grantully Castle*. "The power of the captain in such cases is only limited to the neces-

† 25 and 26 Vict., ch. 63, sec. 35 and 36.

of the case." There can be no doubt that he may imprison a drunken passenger, who assaults his fellow-passengers, but he should not keep the "irons" on him after he has become sober and no longer makes himself generally obnoxious. In fact the master's authority in such a case should be exerted rather with a view to prevent a second repetition of the offence, than for punishment. The comfort and safety of the other passengers will warrant him in interfering to prevent a second offence, and imprisonment may be a necessary alternative where the offender cannot be put on shore.

TRAVERS TWISS.

OUR SEAMARKS.—V.

LIGHTHOUSE ILLUMINATION.

HAVING described the various sources of light used in lighthouses, the next points which suggest themselves for consideration are the means adopted for concentrating the light, so that it may be sent out to sea in the form of a beam, and for making use of the rays which under ordinary conditions would be projected in directions where light was not required for the purpose in view. It will readily be understood that the light from the flame of a lamp distributes itself in all directions; it goes straight upward and downward, and all round. But, to the sailor at sea, lighthouse rays sent up to the sky are of no use, and those falling down on the floor or ground in the immediate vicinity of the lamp are likewise unserviceable to him. It was one of the chief defects of the blazing beacon of old that the greater part of what light there was went up to the sky and comparatively little on to the sea, and this defect was admitted to be a serious one. Moreover, the light from a lighthouse on the edge of the mainland is not required to shine over the land at the back; all that goes in that direction is wasted. As the employment of lighthouses was more generally extended on our coasts, these defects showed themselves

ceeding in directions where their light is not wanted, and to send them in certain other directions, so as to strengthen the beam shining over the sea surface and intended to meet the eye of the mariner. In the catoptric system of lighthouse illumination a number of small lamps (Argand) are employed, and associated with each lamp is a metallic concave parabolic reflector, with its reflecting surface very highly polished. The lamp and reflector are so fitted together that the burner of the lamp is fixed at a certain position in the hollow of the reflector, the oil cistern being at the back. Many of the rays from the lamp proceed directly on to the sea where their light is wanted, but very many fall upon the polished inner surface of the reflector and are thence reflected forward into the beam formed by the direct rays, thus greatly reinforcing it. The form of the reflector is that of a parabola, which is the most effective shape for reflecting forward in a parallel beam all the rays proceeding from the burner which strike its surface. The burner is carefully adjusted so that the flame shall be exactly in what is known as the focus of the reflector; if it were not accurately placed, many of the rays would be reflected off in lines different from those of the direct rays from the flame itself. Let it then be imagined that one lamp with its associated reflector sends out a strong beam of light, with just sufficient lateral divergence to cause the beam to spread out a very little as it advances; it will be obvious that if a cluster or group of such lamps be arranged on a framework in a vertical plane, at a short distance all their beams will coalesce into one large beam, which will be visible to the sailor as one powerful light. In practice three, five, seven, or ten lamps are mounted on a face, and as this method is employed chiefly for revolving lights, there are generally three or four faces, arranged on a trilateral or a quadrilateral frame which revolves mechanically, causing the faces to come round at appointed intervals, each in its turn and at its appointed interval sweeping with its powerful combined beam the area of sea which it is intended to illuminate. The reflectors now in use are made of copper with a thick silver plating, the proportions of the two metals being 6 oz. of silver to 16 oz. of copper. The diameter

they may form an annular condensed beam of light, illuminating the sea from the horizon to within a short distance from the tower.

The object is achieved by enclosing the light in what may be described as a glass hive (the diameter of which varies from 2 to 6 feet according to the importance of the light), on to the internal surface of which nearly all the rays from the lamp are projected. This hive is composed of three parts—the dome, the central belt, and the lower belt. The dome and the lower belt are composed of circular rows of totally reflecting prisms, so fixed as to intercept nearly all the rays proceeding obliquely upwards or downwards from the central lamp. The property of each prism is such that a ray falling upon one of its sides is refracted through the substance of the glass at an angle on to another side, from whence it is totally reflected out through the third side in quite a different direction to that in which it entered the prism. The adjustment of prisms has to be carried out with mathematical accuracy, in order that all the rays from the luminous focus may be caught and sent out in a parallel beam of light, although some few of the rays striking directly upward or downward necessarily escape. The central belt is composed of lenses which gather up all the rays falling upon their inner surfaces, and bend them so that they issue from the other side in parallel lines; and as the parallelism of those issuing from the dome and lower belt is by the adjustment of the prisms made to coincide with the parallelism of the central rays, a powerful beam of light streams from the entire apparatus, striking the sea at a short distance from the tower and, in clear weather, stretching over the waters as far as the horizon. This arrangement is suitable for a fixed light; but for a revolving light, the hive is divided into vertical panels, each of which yields a separate beam. On the hive being made to revolve, the beams from the different panels, separated by intervals of darkness, successively come round like the spokes of a wheel, and the mariner sees the waxing and waning flashes of a revolving light. A further elaboration of the system is that of group flashes, in which the panel of a revolving light is cut up into two or more

details and mathematical formulæ connected with the adjustment of the reflecting and refracting media, we must refer the reader to Mr. Alan Stevenson's Treatise on Lighthouses, Mr. Thomas Stevenson's book on Lighthouse Construction and Illumination, and to various papers on different branches of the subject read by Mr. Jas. N. Douglass, C.E., Mr. Jas. T. Chance, and Dr. Hopkinson at the Institution of Civil Engineers.

Having thus described the apparatus employed for economising the light, it remains to consider briefly the protecting lantern which encloses it. The shape of the lantern is usually cylindrical, corresponding in a general way with the form of the tower, and is surmounted with a dome or conical roof, finished off at the summit with a wind vane or a ball. The glazing of the lantern has to be of stout plate glass of the best quality, having to withstand at times a considerable force of wind, and even the driving against it of small shingle; at night too, birds attracted by the light dash themselves wildly against the glass, falling stunned or dead on the floor of the external gallery which surrounds each lantern. The thickness of the glass usually employed is a little over $\frac{1}{4}$ of an inch. The framing in Scotch lighthouses is diagonal, glazed with flat plate glass in diamond shaped panes. In former times the framing was vertical and a considerable quantity of light was intercepted by the upright astragals. In English and Irish lighthouses the framing of the lantern is helical or spiral and the panes of glass are slightly curved outwards to accord with the curve of the cylinder, and to enable the rays to fall radially upon the inner surface. The curving of the glass is also an element of strength. This lantern is the design of Mr. Jas. N. Douglass, C.E., Engineer-in-Chief to the Trinity House. Effective ventilation is most essential in a lighthouse lantern. Great heat is at times generated by the burning lamp or lamps, and the panes are apt to be obscured by the condensation of aqueous vapour when the warm moist air comes in contact with the colder surface of the glass. To obviate this as far as possible ventilators are placed in the iron panels of the lower part of the lantern, and a supply of fresh air is also admitted through ventilating windows in the watch room underneath the lantern

point out the particular vessels which would be enabled to cope with the swift armed mail steamers of France, Russia, or Germany, they failed to answer the question satisfactorily, and it is not too much to say that if a similar question were repeated now, they could not, unless the swift steamers of private companies were extemporized into men-of-war, convince those who are masters of the subject that commerce is safer now than then. At the time alluded to, probably owing to articles which appeared on the subject, the keels of the *Comus* class were laid. It was stated in one of the leading mechanical journals that their speed would be twenty knots an hour. This assertion provoked the following remarks in an article in *Fraser's Magazine* for October, 1875. "To me it is evident that their proposed speed (which, as I have before said is to be twenty miles an hour) will never be realized. They are to be boxes of guns, &c., &c." How far this prediction has been verified, let those who are familiar with their performance on the measured mile decide, as was stated in a former article. The demon of combination has impaired qualities, without which ships cannot fulfil those services experience has shown to be desirable in cruisers of this class. It should be an axiom with constructors, that science can no more combine all useful qualities in a ship than nature can in men, and the plan fixed on for any particular service ought to embrace only those points which can be brought to a certain conclusion. Amongst these, speed must be paramount, coal capacity next, then armament, and lastly spars presenting as little resistance as possible when steaming head to wind, carefully avoiding any top hamper likely by its fall to disable a gun or imperil the working of the screw. Seamen who have watched the performance of the gigantic schooners on the coasts of North America will readily infer that what is termed a barquentine, square sails forward, and fore-and-aft sails on the two remaining masts, might be largely utilized. There should be nothing over the topgallant sail forward or the single fore-and-aft sails on the remaining masts, in order that all might be made snug on going into action, if necessary slinging the booms over the side to prevent injury from splinters. By taking this precaution, the worst that could befall them would be their destruction. It is pretty certain

Minotaur class as an example. They have four masts, and were originally ship-rigged on three, and barque-rigged on the fourth. By the recommendation of presumed authority some double-topsail yards were fitted on three masts; then the double top-sail yards were condemned, and ordinary ones fitted on two masts. It would be interesting to ascertain if the advisers of the Admiralty in each case calculated the position of the centre of effort of the sails and the effects of altering it, or did they simply cause this very great expenditure for an *opinion* only. Rig them as they may, their qualities under canvas can be expressed in a few words. In moderate weather, say, with the wind at 5 or 6 and a smooth sea their great momentum causes them to stay easily. In a head sea it is unsafe to attempt it. Under similar conditions wearing requires judicious handling; they obey the rudder rather than the sails, and will not without good way pass the critical point with the wind on the quarter. Under steam alone they are simply perfection, toys in the hands of a seamen, notwithstanding the allusions we occasionally see, of the difficulties attending the management of our "ponderous ironclads," our "leviathans," our "gigantic ironclads," &c., &c.

Quite recently this outside pressure on the Admiralty for the attainment of supposed advantages, has become more marked. A gallant admiral on whom all the honours and emoluments of a noble service have been showered until nothing else remains to wish or hope for, suddenly finds out, according to his appeal in *The Times*, that he cannot die happy unless the wives of seamen are granted a pension. It is singular that the gallant officer should have waited until he was past the age allotted to man by the psalmist before he assumed the rôle of a great philanthropist at the expense of the State, for during an unusual career of full-pay service, his name is not connected with any of the great reforms which have added to the comfort, the happiness, or the efficiency of officers, seamen, or their wives. If he runs his finger down that long list of officers with whom he has served or commanded, he will doubtless find many a shipmate whose children are in institutions offering a large field for the exercise of his benevolence in a practical form, or if he reads the reports of the many good

such distinguished positions on the proud rôle of the English Navy.

It is a misfortune that the Naval element is almost eliminated from the House of Commons, and that the value of the services of those who still remain is lessened by the constant introduction of changes in ships and armaments, changes which require unceasing study to enable the most zealous to furnish a just and wise criticism on their merits. However able and scientific a non-professional man may be, it is impossible for him to lucidly explain the many technical points which must arise in a service embracing such a range of subjects as the Navy.

In one important arm of defence, one alike economical and capable of an almost indefinite development, the Navy is still weak. While an ironclad now nearly ready for sea has pretty nearly, if not quite, cost a million sterling without satisfying able critics that her design is worthy of imitation, but little has been done towards creating a fleet of gunboats for home or the northern waters. On this class future admirals must depend for carrying war to the enemy's coast or for protecting their own. One or two heavy guns in each would be sufficient armament. Have no more freeboard than safety warrants, cut away the gripe to give them all possible buoyancy, rig with a single lugsail on a mast fitted with a tumbler, in fact ready to sail to leeward or steam to windward. It would be no great loss to entirely dispense with the sail power, so little is it now used by men-of-war on the coasts of the United Kingdom. The representatives of the present class of gun vessels are often heavily masted with high wooden bulwarks, small power, low speed, and from their construction necessarily limited in the number of bulkheads and highly combustible. On the effectiveness of watertight divisions the safety of fighting ships must in a great measure depend. To multiply them will cramp accommodation, but efficiency is paramount to every other consideration when the interest of the country is at stake. There is a general feeling in favour of the introduction of twin screws for all classes of ships. In those of great length the advantage of being able to manœuvre quickly or to make a passage with a single engine is an advantage not to be lightly gainsaid.

seamen. The names of some are embalmed in those quaint old ballads known in former days as "fore bitters." The men who sang them have passed away. Their successors are of a different stamp, and unless a zealous compiler takes the task in hand the ballads must follow. However, our task is with the present. The *Shah* is a noble, expensive, and it is to be feared an unprofitable specimen of Naval architecture. The following extract from an article written before she was commissioned has been verified in a remarkable manner:—"Although the transverse strength of a ship depends on the sectional area of the fore-and-aft iron, the stiffness depends in some measure on the transverse, and it is feared the shaft of the *Shah* will cause much trouble to the engineering department owing to the great distance the frames are apart. Again, it is possible, having regard for speed alone, that her sailing will be impaired by the poop and forecastle. Both are convenient and useful, but when a certain quality in a ship is sought after, no known defect should interfere with its realisation. Experience and theory have alike demonstrated that weights in the ends of fine lined ships seriously impair their sailing qualities, and if there is a class where this should have been avoided it is that of the *Shah*. It is evident that vessels of the type are designed for cruisers only. In beauty of form and handiness they surpass those of other navies. *Against an ironclad they would not have much chance of success*, but on the distant stations to which they will be sent it is scarcely probable such an enemy will present himself. *If so their great speed will stand them in good stead.*" It must not, however, be forgotten that very expensive ships cannot be used as regular cruisers to protect commerce. The demand for coals and men would be far in advance of what can be reasonably demanded for the service. Then their first cost is sufficient to build double the number of equally serviceable ships for that particular purpose. Since the foregoing was written the action between the *Shah* and *Huascar* has been fought, and seamen are tempted to inquire if the stem of the former is not sufficiently powerful to be used as a ram. We know that on the Atlantic the large mail steamers occasionally strike an iceberg when steaming at a high rate of speed, yet in no instance has one

men at the wheel on entering port, or half that number at sea in bad weather, and so they cast about for means to remedy such a tax on the resources of their ships. The genius of Mr. Macfarlane Gray first solved this most important problem, which places the largest ship under the control of a single helmsman. Since that time innumerable patents have been taken out for similar inventions, but it may well be doubted if any surpass his in simplicity of detail—so simple, indeed, that after a single lesson an intelligent quartermaster becomes master of the subject, able in a few seconds without the presence of an engineer to shut off the steam, disconnect the engine, and connect the hand-gear.

The *Hercules* was at the date of her launching a formidable vessel, but the last additions to the Navy have justly thrown her into the second line of defence. The balanced rudder is a dangerous fitting, as it now is, for shallow water. As practice demonstrates, the lower part has not much effect on the steering, the keel should have rested on a bracket a foot or more up the post. The object at the time was to render the working of the helm easy when the ship was going under a full head of steam. The invention previously alluded to has rendered the balanced rudder unnecessary. As a sailing ship her powers are not worthy of commendation; indeed, with her as with many others, the sooner an old-fashioned rig is replaced by one better adapted to the existing order of things, the sooner we shall be on the road to effectiveness. An American President once said: "Don't prophesy unless you know." By changing a single word it reads, "don't criticise unless you know" a most judicious piece of advice to all who attempt to indicate the weak points of any particular line of defence. It has been strictly followed throughout an article of unusual length, and the writer will leave to abler pens the defects or otherwise of these powerful fighting machines whose names and requirements are so often before the public. Actual warfare will alone prove if it is not possible for superior seamanship and calm indomitable courage to checkmate the advantages now supposed to rest beneath armour of almost unknown thickness, sheltering guns of almost unknown power and range. In a certain sense torpedoes have effected this, but dangerous as they unquestionably are, it would be hazardous

to offer an opinion on what the science of destruction may produce, and the fate of an expedition may yet rest on a savant can carry in his waistcoat pocket. However this may be, it is pretty certain that every improvement in the torpedo, and every reduction in the effectiveness of very large ships, consequently, gun vessels must play an important part in the wars of the future. As the large ships of the fleet have ceased to afford the same protection as they formerly did, there is only one course open, to increase coast defences by adding in every known way to the effect of a volunteer army and navy. It was long the custom for the Admiralty to appoint a committee of experts, who ought to have known better to ridicule both these suggestions, which certainly owe their existence more to the far seeing of a few patriotic men, whose keen view of the future enabled them to rescue the movement from oblivion, than to any encouragement they received from the Admiralty or the War Office. From circumstances on which it is unnecessary to dwell, the force is beginning to be estimated, at its proper value, experience having unmistakeably demonstrated that a good education, a keen eye, and a steady hand are not a bad stock-in-trade under certain conditions, to commence soldiering with.

It may be a work of supererogation to return to the question of a National Station Bill, but the subject is of such tremendous importance to a wealthy nation that the present lack of organization cannot be too deeply impressed on the minds of thinking men, quite irrespective of any political creed or party. The elements of war are already laid, and at any moment an act insignificant in itself may give the signal for a general conflagration throughout Europe. We cannot, if we would, putting aside all notions of national honour, coolly look on when vital interests are threatened. At the first outbreak a surprise might entail consequences which the keenest vision cannot now penetrate; and yet at this moment when England is in the zenith of her power, there are none amongst that long roll of men-of-war fit to hunt from the seas the extemporised mail steamers of foreign nations. If this movement should be questioned, we would ask, Can any one name a squadron which in winter can cross the Atlantic in any direction? The Admiralty are pestered about imaginary French

by officers who appear to think that ironclads are only required to make us secure. There cannot be a greater mistake than to nurse such an illusion. The next war will strike commerce on every sea, and unless a different type of ship is launched to protect it it will strike hard too. It seems almost incredible that a gallant admiral should publicly hold up the *Shannon* as one of a class destined to sweep the sea of "the wasps that preyed on commerce." Yet another point: a large force of naval reserves of various denominations are enrolled, but where are the depôts for housing them if called out, for some of our guard ships are turned into dormitories for future Nelsons or palaces for their progenitors. Except on festive occasions, women are out of their proper element on shipboard. Even in these days of the refined British tar and polished Royal Marine, language is used and sights may be witnessed on shipboard which modest women will do well to avoid. On children this species of life acts most injuriously, especially in the case of girls. Of course, these evils fall exclusively on the individuals who, from interested motives, put themselves and families in a false position. But there are others which fall heavily on the public service. The ladies of garrison towns are notoriously gossips and idlers, and ship visiting, when there is no waterman to pay, becomes a delightful resource; the consequence is that a ship of war is turned into a species of fashionable lounge. It does not end here. Alike in ward-room, gun-room, and engineers' messes little jealousies are engendered. Her ladyship, in dispensing the hospitalities due to her position, must, to use a well-known proverb, "*draw the line somewhere.*" This she generally does by shutting out certain classes or by timing her invitations in such a manner that young men of spirit writhe under them. By these practices the stern training and discipline which alone make war successful are replaced by what are doubtless called the amenities of civilised life.

In an article like the present it would be impolitic to ignore the existence of another possible danger to this country. A project is not only contemplated but is actually commenced, to practically connect Dover with Calais, a feat, when completed, which would make us a member of the European family; the adding one more

all that may be done by Englishmen to make it so. Then is it wise to break another link in a chain of defences already inefficient, while at home and abroad uncertain and dangerous elements are ready to explode at any moment ?

NOTES FROM CONSULAR REPORTS.

H A Y T I .

Jacmel.—The Vice-Consul gives an unfavourable report of the present state of commerce at this port. He remarks on the greater enterprise of the American trader who sends travellers to note the state of the market, &c., and arranges at once to meet new demands, while British merchants leave the field open. The carrying trade is chiefly conducted by British vessels. The exports are coffee, logwood, orange peel, and cocoa ; the imports being cotton goods (manufactured), shoes, clothes, straw hats and hardware.

A statement important to shipmasters is that beef is only procurable from time to time, and the meat sells bone included at 1s. per lb. ; fowls, from 1s. 3d. to 2s. each ; ducks, 3s. ; turkeys, 4s. Vegetables are very rarely procurable.

ITALY.

Brindisi.—The Consul is of opinion that this port derives its importance solely from its being the port of call for the P. and O. Company's steamers in connection with the conveyance of the inward and outward mails and passengers to India. The actual trade of the port is very small and consists principally of coal imported and wine and oil exported.

Bari.—This rising seaport near Brindisi has accommodation for vessels of large size ; oil and grain are exported in considerable quantities, while coal, iron, and cotton goods are imported. Many people are of opinion that Bari will before long assume a position of great commercial importance.

Cagliari.—The import and export trade of this port for 1880

and brass articles, hides, woollen and silk stuffs. Great Britain appears to have sent the largest share of the imports. The number of British ships at Naples in 1880, however, is behind that of French ships, although, owing to the new Australian line which calls at Naples, there is shown an increase of ten vessels under the British flag at this port in 1880, as compared with the previous year.

At Gallipoli and some other small neighbouring ports, large shipments of olive oil continue to be made.

JAVA.

The chief exports are sugar, coffee, rice and some small shipments of tobacco, tea, india rubber, indigo and spices. Imports consist mostly of cotton and woollen goods, iron, machinery and petroleum. The export business for 1880 is reported to have been carried on upon a steady and careful basis. The import trade for the same period has not proved satisfactory. The cattle plague which has continued to prevail during the year and the extraordinary mortality among the natives have in great measure contributed to this result. Swedish iron competes successfully against that of English makers and large orders for machinery have been sent to England, France and Belgium. The importation of petroleum increases though not at highly remunerative prices. The Government chinchona crop for 1880 was a very good one.

MADEIRA.

The shipping which entered and cleared from the port of Funchal in 1880 was mainly British, and shows an increase on former years. The Consul reports that there was not anything in the course of the trade of this district during the year 1880 of a nature to call for special remark, beyond the increased value of exports in British vessels resulting from the increased export of Madeira wine and an increased re-export of British coal for the use of steamships visiting the port.

MOZAMBIQUE.

This province appears to be waiting for further development. The Consul's tone about its present condition is desponding,

but he points out possibilities which might be taken advantage of by enterprising traders. The Portuguese are not so colonizers, and Mozambique with its fine natural harbor fertile interior country still remains little better than a penitentiary and a locality avoided by settlers. Detailed returns are not given, but the chief exports appear to be the "gergelim," and "amendoim," cowries, cocoa-nut oil, india ivory, rice, hides, &c. The imports which have found a market are dry goods of all kinds, cotton, petroleum, and all the miscellaneous goods that are useful to a half civilised population.

Berdiansk.—A Russian grain port on the Sea of Azov, on which a fair trade used to be carried on, but latterly, on account of bad harvests and American competition, the trade has very much fallen off. The Vice-Consul says, merchants now unanimously consider that all hopes of shipping Berdiansk grain to Great Britain at a profit must be given up, even supposing a good market is available. There is some mention of improved petroleum, but at present the price is too high to compete with American.

Taganrog.—One of the chief grain ports of Southern Russia. The year 1880 is reported to have been the dullest and least successful in business within the memory of any of the inhabitants. Bad harvests, long and severe winter, closed navigation, flood, and the corn beetle have all contributed to this result. Wheat, barley, linseed, rape-seed, and wool appear to be the chief exports. Iron rails and machinery, tobacco, dried fruits, nuts, and so on, were the principal imports in 1880. The greater part of the export carrying in 1880 was done by British vessels at London. Additional facilities have been provided for loading and discharging in the roadstead. The coal and steel industry of the interior is encouraging, and only wants development.

MANILLA AND THE PHILIPPINE ISLANDS.

The exports for last year show a marked advance in quantity, Great Britain being the receptacle for the largest proportion. Sugar is the staple commodity, and great efforts are being made to develop the trade so as to increase the quantity of exports. The value of sugar exported in 1880 amounted to

£2,620,000. Hemp and coffee are also produced in great abundance and largely exported. Tobacco and cigars from these islands are finding an improved market. The Consul could give no figures or details about imports, except to say that trade had been fairly brisk. Spanish shipping visiting Manilla were run very close by British vessels.

PALMA—BALEARIC ISLANDS.

The report for 1880 shows a falling off as regards British vessels visiting this port, which is said to be due to the employment of steam in lieu of sailing colliers. There is little to chronicle. Coals are the chief import from Great Britain; some native wine and a few small things were the principal exports, but the trade is on a very small scale.

Minorca.—Trade more depressed than ever; some boots and shoes to Cuba, occasional but rare exports of corn and cattle, and a small quantity of cotton stuff. Coal from Great Britain is the chief import.

Iviza.—Some mines here which appear to be earning some profit. Apparently nothing else doing.

BEYROUT.

There appears to be considerable difficulty in obtaining information regarding the commerce, &c., of this port. It is clear, however, that the year 1880 showed a falling off. Exports of tobacco, oranges, olives and silk are carried on with some activity, and imports of iron from Great Britain, petroleum from America, cotton and wool from various places are recorded. The Consul thinks the agricultural capabilities of the country are under-rated and could be very advantageously developed. The administrative system is reported to be very corrupt, which operates seriously against commercial progress; 394,846 tons of shipping visited Beyrout in 1880, the vessels being chiefly Russian, Austrian or British.

CRETE.

Olive oil and soap are the two staple exports; wine of the country is finding a market in Europe, and other exports are locust beans, oranges, lemons and valonia. Imports for 1880

it remains so I cannot understand. It would be a valuable service if these coasts, where so many of the shoals are supposed to be volcanic, were accurately surveyed, as for instance, Graham Shoal which in August, 1831, was 160 feet high, and in January, 1832, was below water, last survey in 1841 showed 10 feet on it. We have so many *real* dangers to contend with, that all doubtful ones, either in shoals, or soundings, or lights, ought to be surveyed. Apologizing for trespassing on your valuable time and space,

I am, Sir, yours respectfully,

J. PROTHEROE, (s.s.) *Heptarchy*.

UNSINKABLE SHIPS.

To the Editor of the "Nautical Magazine."

SIR,—The great loss of life caused by the foundering of the *Teuton*, and the many very narrow escapes I have known, induce me to write this letter, which I hope you will kindly insert in your valuable Magazine.

First class steamers are generally divided into six watertight compartments; practically, only two of these are of any use namely, the collision bulkhead and the after one, any of the others filling would sink the ship. Even if they would not, I have never seen one strong enough to stand the weight of water with a ship tumbling in a seaway.

I think that all passenger ships should be unsinkable. They should have a fore-and-aft division running the whole length of the ship, through engine-room and all, and have athwartship bulkheads in such small divisions as would render their sinking impossible. Their strength should be properly tested.

The whole thing is only a matter of money. I have not the least doubt that any of our large builders could turn out an unsinkable ship. She would, of course, be obliged to have twin screws. They would be a great advantage, as a total breakdown would be nearly impossible. Light masts could be carried, and yards done away with. I am satisfied by experience that in full-powered steamers they are more harm than good.

the above plan has fully answered its purpose ; that is, to show to an approaching vessel whether or not a pilot vessel is competent to, and will, obey the Rules of the Road at sea ; and that both pilots and shipmasters highly approve of the change.

To my mind, it is simply carrying out the Regulations which came into force on the 1st of September of last year, which says, that " A pilot vessel when not engaged on her station on pilotage duty shall carry lights as other vessels," which I believe means, when not actually hove-to, with her boat alongside, or away communicating with a vessel ; for surely all those words would not have been used if the intention was simply to say, " is anywhere else but on her station." And the same may be said of the counter-part to this regulation.

The use of side-lights, as set forth in the above-given notice to mariners, by the pilot brigs off the Hooghly, had the sanction of the Board of Trade, before it was put into practice.

Yours faithfully,

SAML. R. ELSON, Senior Master Pilot.

Calcutta, 28th October, 1881.

RED RAYS THROUGH FOG.

To the Editor of the " Nautical Magazine."

SIR,—It may be of use to the readers of your magazine to know the non-effect of red rays through fog, which I experienced the night before last in a mail steamer from the West Indies.

Entering the English Channel, wind S.W. moderate, weather dark, with passing clouds, inclined to fog on horizon, we struck soundings at 8 p.m. on the 10th inst.: the depth and the nature of the bottom agreed well with our position, and we continued on our course for the Lizard. At 8 p.m. sent a man aloft to look for St. Agnes Light, as it was thought that a heavy S.W. swell then running might set us sufficiently to the northward to get us within its radius. At 9 p.m. observed a revolving or flashing (in the state of the weather it was difficult to say which) from the bridge (not the topsail-yard), which on the first natural assumption that it was St. Agnes Light was pricked off on the chart, and

problem, the Mercator's diff. of lat. is 22, and the computation of the sun's bearing is 13° . In the 13° traverse table, 22.4 is the nearest in the lat. column, for which the dep. is 5.2. A glance at the next lowest figure in the lat. column shows that 5.1 is nearer, and this therefore is the correction of long., to be applied in diminution of the long. found, because that is east, and the correction, as the error in lat. was north, is westerly.

The same result could be worked out graphically on a piece of paper, very rapidly, and with no fear of error, by a good-sized compass card as the protractor. Prick through the centre the north and south points and the degree which is at right angles to the sun's bearing. The centre is the ship's place, join the N. and S. points for the meridian, project the line of equal altitudes through the ship's place, and then, when the error of lat. is found, find Mercator's diff. of lat. and lay it down from the ship's place. A line at right angles to the meridian drawn through the true lat. intersects the line of equal altitude in the true long., and the length of that line, measured on whatever scale has been adopted, gives the correction in mins. of long.

F. R. M.

CERTIFICATED ENGINEERS.

To the Editor of the "Nautical Magazine."

SIR,—A British steamship was abandoned off the Brazilian coast on fire in May last. As the vessel was principally laden with petroleum the crew had to quickly take to the boats, and being fortunately within sight of the coast they were able to effect a landing, and after considerable hardship safely arrived at Pernambuco. At a Naval Court of Inquiry held at the above port the fire was proved to have originated in the after hold, through the carelessness of the third engineer putting a naked light to a hole he had cut in the screw-shaft tunnel, according to the chief engineer's orders. It appears that the chief engineer held only a second-class certificate, and both the second and third had seen but little experience at sea. Here we have a comparatively new vessel lost through the carelessness of the chief engineer, who

BOOKS RECEIVED.

Tables relating to Life Salvage on the Coasts of the United Kingdom during the year ending 30th June, 1881; showing the different Life-saving Apparatus Stations, with particulars of services rendered by the Rocket Apparatus, and the number of lives saved.
London: Issued by the Board of Trade, October, 1881.

WE have on previous occasions noticed the issue of these tables. The past year (ending June, 1881), has been the most important one in the history of the rocket apparatus, no less than 657 lives have been saved by its means; the great increase for the year, being principally due to the heavy gales which prevailed on our coasts on October 28th and January 18th, when 264 and 139 lives respectively were saved. The storm of the 18th January was accompanied with snow and intense cold, rendering the services of so specially arduous a nature, that the Board of Trade deemed it expedient to double the usual allowances to the men employed, in addition to the £1 reward for each life saved. It is also well to note that, in order to still further encourage exertions, the Board of Trade have commenced to give medals in bronze and silver for special gallantry, and the bravery of George Williams appeared to them to be so exceptional, that the President recommended him to Her Majesty the Queen for the Albert Medal, which she was graciously pleased to grant. The record of the service is as follows: George Wilson, coastguard boatman, Uzon: wind at force 10, with snow; time, 7.45 a.m.; communication was effected with the Norwegian brig *Ranger* by the third rocket, but the crew did not seem to understand how to use it: G. Williams thereupon got into the breeches buoy, and after great difficulty and risk reached the vessel, and succeeded in sending ashore the crew; granted the Albert Medal (second class) and £4 in addition to the usual allowances. Of lifeboats there are now 296 on our coasts, while 288 places are supplied with life-saving apparatus and 388 with belts and lines.

the majority of navigators. In the edition for 1882, the tidal constants of height have been largely increased in number, which is a decided improvement. In the preface are also given the various tables and arguments by means of which the times and heights of high water have been calculated—these are chiefly due to the late Sir J. W. Lubbock and Dr. Whewell, with corrections deduced from Bernoulli's theory; but the basis for the heights of high water at Liverpool are entirely new, and are the result of ten years' observations made by the Rev. J. Pearson, of Fleetwood.

The Naval Architects' and Shipbuilders' Pocket Book. By Clement Mackrow, M.I.N.A. Second Edition. London: Crosby, Lockwood and Co. 1881.

We are glad to receive a copy of the second edition of this most useful compendium, which the author states has now undergone thorough revision. On a previous occasion we have expressed our high appreciation of the value of this work.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. W. P. Thompson and Boulton, British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C.; Berridge Street, Leicester; and by W. P. Thompson & Co., 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS).

8555. Henry Rednap, Arragon Road, Twickenham, Middlesex.
"An improved means or apparatus for conveying messages and articles of property from ships."

8578. Mark Heaton Robinson, Hampton Wick, Middlesex.
"Improvements in boat disengaging gear."

8579. Benjamin Lumsden Thomson, Fenchurch St., London.
"Improvements in protecting ships or vessels, or other submerged or partially submerged surfaces."

partly applicable to other parts of ships' furniture." (A communication.)

4868. James Dickie, of King William Street, London. "Improvements in ships or vessels for inland and ocean navigation."

4912. William H. Mallory, of Bridgeport, Connecticut, U.S.A. "Improvements in torpedoes." (A communication.) (Complete specification.)

PATENTS PUBLISHED.

832. January 25, 1881. Price 6d. Charles Cullen, of Rosherville, Gravesend. "Improvements in ships or vessels." This invention relates to certain improvements applicable to existing ships or vessels, or in the construction of new vessels, by which in the case of injury through collision, sufficient buoyancy is obtained to keep the vessel afloat, by having two sets of iron plates between decks, thus forming air chambers, and by closing the hatchways the water is prevented from rising to the upper or lower parts of the vessel. In river passenger steamers, the tables, lockers, seats, &c., are formed as air chambers, so as to rise to the underside of the deck in the event of the vessel filling with water, whereby buoyancy is obtained, and the lifting power is brought to bear upon the vessel as close as possible to the weight, and so prevent her capsizing.

693. February 17, 1881. Price 8d. Thorsten Nordenfelt, St. Swithin's Lane, City. "Improvement in or appertaining to submarine or subaqueous boats or vessels." This invention has for its object improvements in submarine vessels or boats. The hull is constructed to withstand pressure of water, and laterally its section is a perfect circle, being propelled by a screw propeller. For causing the descent of such boats, upright tubes pass through the vessel, containing screws which are driven by shafting; the vessel having a certain amount of buoyancy rises to the surface when the rotation of the screws and power is suspended. Automatic steering gear is provided to prevent the vessel from deviating far from a horizontal position when afloat.

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

By applying the Tidal Constant of the place, according to its sign (+ *add.* - *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

PLACE.	CONSTANT.	PORT OF REFERENCE.	PLACE.	CONSTANT.	PORT OF REFERENCE.
	H. M.			H. M.	
Aberdeen	-1 17	Leith	Jersey (St. Heller)	+2 38	Brest
Aberystwyth	-3 52	Liverpool	Kinsale	-0 18	Queenstown
Alderney	+2 59	Brest	Lerwick (Shetland) ..	-3 47	Leith
Antwerp	+5 13	Dover	Limerick	+1 16	Queenstown
Arbroath	-0 42	Leith	Lisbon bar	-1 17	Brest
Arcachon	+0 50	Brest	Littlehampton	+0 31	Dover
Arklow	-2 25	Kingstown	Llanelly bar	-0 38	Weston-s.-Mare
Ayr	-0 18	Greenock	Lowestoft	-4 1	London
Banff	-1 49	Leith	Lynn & Boston Deep ..	-0 29	Hull
Bantry harbour	-1 14	Queenstown	Margate	-2 18	London
Barnstaple bridge	-0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
Bayonne	-0 2	Brest	Millford Haven entr. ..	-0 38	Weston-s.-Mare
Beachy head & Rye bay	+0 3	Dover	Montrose	-0 62	Leith
Beaumaris	-0 51	Liverpool	Morlaix	+1 6	Brest
Belfast	+2 42	Londonderry	Needles point	-1 26	Dover
Berwick	-1 5	N. Shields	Newcastle	+0 23	N. Shields
Blyth	-0 8	N. Shields	Newhaven	+C 39	Dover
Bordeaux	+3 3	Brest	Newport	+0 16	Weston-s.-Mare
Boulogne	+0 13	Dover	Nieuport	+1 6	Dover
Bridport	+0 23	Devonport	Nore	-1 38	London
Bristol & King Road ..	+0 19	Weston-s.-Mare	Orfordness	-2 43	London
Cadiz	-2 2	Brest	Oporto	-1 17	Brest
Caernarvon	-1 56	Liverpool	Ostende	+1 18	Dover
Calais	+0 37	Dover	Padstow	-1 41	Weston-s.-Mare
Campbellton	-0 23	Greenock	Peel, Isle of Man	-0 15	Liverpool
Cardiff	+0 2	Weston-s.-Mare	Pembroke Dock	-0 42	Weston-s.-Mare
Cardigan bar	-4 23	Liverpool	Penzance	-1 13	Devonport
Carlingford bar	-0 10	Kingstown	Peterhead	-1 43	Leith
Chatham	-0 47	London	Piel harbour, Barrow ..	-0 18	Liverpool
Cherbourg	+4 2	Brest	Plymouth breakwater ..	-0 6	Devonport
Coleraine	-1 37	Londonderry	Poole	-2 2	Dover
Coquet Road	-0 23	N. Shields	Port Carlisle	+0 47	Liverpool
Cordonan Tower	-0 10	Brest	Portland breakwater ..	+1 18	Devonport
Cowes (West)	-0 27	Dover	Port Patrick	-0 58	Greenock
Crinan	+4 41	Greenock	Portsmouth	+0 29	Dover
Cromarty	-2 21	Leith	Ramsgate	-2 19	London
Dartmouth	+0 33	Devonport	Rotterdam	+4 33	Dover
Deal & Downs	+0 3	Dover	Santander	-0 17	Brest
Dieppe	+7 19	Brest	Scarborough	+0 48	N. Shields
Donaghadee	+0 3	Kingstown	Selsea bill	+0 33	Dover
Donegal harbour	+0 17	Queenstown	Sheerness	-1 21	London
Douglas & Ramsay	-0 11	Liverpool	Shoreham	+0 22	Dover
Dublin bar	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
Dundalk	-0 16	Kingstown	Southampton	-0 42	Dover
Dungeness	-0 27	Dover	Spurn point	-1 3	Hull
Dunkerque	+0 56	Dover	St. Ives	-2 10	Weston-s.-Mare
Exmouth	+0 38	Devonport	St. Malo	+2 18	Brest
Falmouth	-0 46	Devonport	St. Mary (Scilly)	-1 16	Devonport
Fecamp	+6 57	Brest	St. Nazaire	-0 7	Brest
Ferrol	-0 47	Brest	Stornoway	+0 38	Greenock
Flamborough head	-1 59	Hull	Stromness (Orkneys) ..	-5 17	Leith
Fleetwood	-0 12	Liverpool	Sunderland	-0 1	N. Shields
Folkestone	-0 5	Dover	Swansea bay	-0 53	Weston-s.-Mare
Fowey	-0 29	Devonport	Tay bar	-0 11	Leith
Flushing	+1 42	Dover	Tees bar	+0 22	N. Shields
Galway bay	-0 26	Queenstown	Tenby	-1 12	Weston-s.-Mare
Gibraltar	-1 27	Brest	Thurso	-5 40	Leith
Glasgow (Port)	+0 10	Greenock	Torbay	+0 17	Devonport
Gloucester	+2 51	Weston-s.-Mare	Tralee bay	-0 58	Queenstown
Granville	+2 24	Brest	Ushant (Ouessant)	-0 15	Brest
Gravesend	-0 43	London	Valentia harbour	-1 19	Queenstown
Grimsby (Great)	-0 53	Hull	Waterford	+0 19	Queenstown
Guernsey (St. Peter) ..	+2 50	Brest	Westport	-0 4	Queenstown
Hartlepool	+0 5	N. Shields	Wexford	+2 20	Queenstown
Harwich	-1 53	London	Whitby	+0 23	N. Shields
Havre	+6 4	Brest	Whitehaven	-0 9	Liverpool
Helsingland	+0 21	Dover	Wick	-2 55	Leith
Holyhead	-1 13	Liverpool	Wicklow	-0 41	Kingstown
Holy Island harbour ..	-0 53	N. Shields	Workington	-0 19	Liverpool
Honfleur	+5 43	Brest	Yarmouth road	-4 48	London
Inverness	-1 59	Leith	Youghall	+0 18	Queenstown

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	PLACE.	SUBJECT.
416	ENGLAND—South East Coast—Folkestone Harbour	Lights on end of pier extended
417	" Bristol Channel—Cardiff Spit Buoy	Change of position.
418	NORTH SEA—Schelde River—Wandelaar Bank	Buoy lighted by gas.
419	" Jade River—Schillighorn Lights	Delay in alterations.
420	" Schouwen Bank	Light-vessel placed, bell withdrawn.
421	BALTIC—Russia—Cape Steinort	Shoal ground and beacons.
422	" Gulf of Finland—St. Petersburg Bay—Peterhof	Fog-signal on pier.
423	" Gulf of Bothnia—Sweden	Bonan, Hernö, &c., lights and tions.
424	" " " Gase Sten	New leading lights.
425	NORWAY—West Coast—Ytterö	New light.
426	FRANCE—North Coast—Cape de la Hague—Foraine Rock	Automatic signal buoy.
427	SPAIN—South Coast—Cadix Harbour—Los Cochinos Shoal	New beacon; bell-buoy removed
428	MEDITERRANEAN—Tunis—Gulf of Kabes—Djerba Island	New light-vessel.
429	" Italy—West Coast—Gulf of Spezia—S. Maria and S. Teresa	Alterations in lights.
430	" Adriatic—Gulf of Quarnero—Sansego Island—Mount Garbo	New light.
431	" Greece—Piræus	Permanent light re-established
432	NORTH ATLANTIC—Cape Verde Islands—St. Vincent Island—Porto Grande	New harbour-light on C house pier.
433	INDIA—Bay of Bengal—Madras—South Harbour Pier	Buoy removed.
434	" Bay of Bengal—Gulf of Martaban—Rangoon River—Eastern Grove	Temporary light; alterations made in old light.
435	SOUTH AUSTRALIA—Rivoli Bay—Beachport	New permanent light on jett
436	AUSTRALIA—South Coast—Port Phillip	New light.
437	NORTH AMERICA—Vancouver Island	Various alterations.
438	UNITED STATES—Pacific Coast—Juan de Fuca Strait—Puget Sound—West Point	New light and fog-signal.
439	SOUTH AMERICA—Magellan Strait—Sandy Point Road	Buoy over wreck of H.M.S. I
440	WEST INDIES—Venezuela—Maracaybo	Alterations in the bar.
441	UNITED STATES—Rhode Island—Block Island	New whistling signal buoy.
442	" Massachusetts—Holmes' Hole (West Chop)	Fog-signal at light station.
443	CANADA—Bay of Fundy—St. John	Alteration in position of anti-buoy.
444	" Prince Edward Island—Souris Lighthouse	Ray of red light.
445	GULF OF ST. LAWRENCE	Various alterations in fog-sig
446	" " Anticosti Island—Heath Point	New fog-signal.
447	" " South Shore—Anne Point	New fog-signal.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

416.—ENGLAND. — *South-East Coast.—Folkestone Harbour.—Fixed Lights on New Pier Extension Works.*—On 1st October, 1881, two lights would from time to time be exhibited from the extremity of the railway pier extension at that place, as the works are extended seaward :—The lights are *fixed white*, placed vertically 6 feet apart ; they bear south from the red light at Folkestone outer harbour entrance, and are about 100 feet seaward of the fixed light marking the extremity of the pier prior to this extension.

417.—ENGLAND. — *Bristol Channel.—Change in Position of Cardiff Spit Buoy.*—Owing to the Cardiff Spit having grown out to the S.W., the buoy has been moved 4 cables S.W. $\frac{1}{2}$ W. from its former position, and now lies in $2\frac{1}{2}$ fathoms at low water spring tides, with the north cliff of Sully island just open of Ball point, W. $\frac{1}{2}$ S. ; the high chimney at Grangetown in line with the north end of a grove of trees, N.W. by N. ; Monkstone beacon, S. $\frac{1}{2}$ E., distant $\frac{1}{10}$ of a mile ; and west Cardiff buoy, W. by S. $\frac{1}{2}$ S., distant $1\frac{1}{10}$ ths mile.

418.—NORTH SEA. — *Schelde River Entrance. — Wielingen Channel.—Buoy lighted by gas on Wandelaar Bank.*—On 5th October, 1881, a buoy lighted by gas (Pintsch system) was placed experimentally westward of the buoy (black and red horizontal stripes) on Wandelaar bank, Wielingen channel, Schelde river entrance. The buoy, painted dark brown and easily recognised by the light apparatus, exhibits a white light, elevated 10 feet above the sea, visible in clear weather from a distance of 7 miles. Position, lat. $51^{\circ} 22' 35''$ N., long. $3^{\circ} 1' 45''$ E.

419.—NORTH SEA. — *Jade River Entrance.—Schillighörn Lights.—Delay in intended Alterations.*—With reference to Notice No. 383, p. 891, on intended alteration in the position of the lighthouse at Schillighörn, west side of Jade river entrance, and consequent alterations in the lights,—further notice has been given that the

Steinort.—In consequence of a sunken danger having been reported to lie off the coast of Courland, bearing N.W. by compass, distant 4 miles from Cape Steinort beacon, and on which it was stated the British steam-vessel *Coleridge* struck in the summer of 1881—an examination of the locality has been made by order of the Russian Government with the following results. The shoal ground did not exist in the position assigned by the master of the s.s. *Coleridge*; and from remains of the cargo thrown overboard at the place of grounding, the vessel struck on the shoal ground off Cape Steinort at three-quarters of a mile from the shore. In the course of the examination, a rock with 8 feet water over it was found (on the extremity of shoal water extending from Cape Steinort as marked on the chart) with Cape Steinort beacon bearing S. 88° E., distant one mile. South-eastward of this rock the depths were found to be 10, 14, and 18 feet, afterwards decreasing gradually to the shore—north-westward of the rock, the soundings increase regularly. Two perches, coloured black and white, and surmounted by brooms turned upwards, have been placed north-westward of the 8-feet rock in 6 fathoms water.

422.—BAL TIC.—*Gulf of Finland*.—*St. Petersburg Bay*.—*Peterhof*.—*Fog-signal on Pier*.—A fog-signal has been established on the pier at Peterhof, south side of St. Petersburg bay.

423.—BAL TIC.—*Gulf of Bothnia*.—*Sweden*.—(1) *Bönan Light*.—*Sector of Red Light*.—The following alteration has been made in the light (fixed white) exhibited at Bönan, northern channel to Gefle. A sector of red light is shown, visible seaward between the bearings of N. 65° W. and S. 65° W. *Variation*, 9° W.

(2) *Hernö*.—*Light on Eastern Point*.—Exhibited from the south-east angle of the pilots' house on the eastern point of Hernö. It is a fixed red light, visible seaward between the bearings of N. 11° W. and S. 18° E.; elevated 65 feet above the sea, and should be seen from a distance of about 5 miles. Position, lat. 62° 36' 30" N., long. 18° 4' 30" E. This light will be exhibited annually from 1st August until the close of navigation. *Variation*, 8½° W.

(3.) *Bredskär, Ronnskär, and Malören Lights*.—*Alteration in*

Cochinos shoal, south side of the main channel to Cadiz harbour, has been withdrawn ; and a beacon has been erected on that shoal, north-eastward of the rocks that uncover at low water. The beacon consists of an iron tube, $2\frac{1}{2}$ feet in diameter and $19\frac{1}{2}$ feet high, painted black and surmounted by a bright ball.

Note.—Vessels entering Cadiz harbour by the main channel, should leave Los Cochinos and Las Puercas beacons, also El Fraile buoy, on the starboard-hand.

428.—MEDITERRANEAN.—*Tunis.*—*Gulf of Kabes.*—*Light-Vessel Near Djerba Island.*—A light-vessel bearing the name of *Mater*, has been placed near Djerba (Djerbah or Jorbah) island, south side of entrance to the gulf of Kabes. It shows a *fixed white* light, elevated 39 feet above the the sea, and visible from a distance of about 3 miles. Position approximate, lat. $33^{\circ} 56' N.$, long. $10^{\circ} 50' E.$

429.—MEDITERRANEAN.—*Italy.*—*West Coast.*—*Gulf of Spezia.*—*Alterations in Santa Maria and Santa Teresa Lights.*—With reference to previous Notice on intended alterations in the positions of the lights exhibited at Santa Maria and at Santa Teresa points, gulf of Spezia, on July 15, 1881, the following alterations were made :—

Santa Maria.—Two *fixed white* lights, placed vertically $4\frac{1}{2}$ feet apart, are exhibited from a staff on the eastern point of the lower embankment of Santa Maria fort. The upper light is elevated 49 feet above the sea.

Santa Teresa.—The light of Santa Teresa is *fixed white*, elevated 42 feet above the sea ; it is shown from a staff near the western extremity of the mole below the fort. Both Santa Maria and Santa Teresa lights have at their bases a pyramid of stone, on which stands a wooden watch-house, with staff above from which the lights are shown.

Note.—In consequence of alterations at the extremities of the breakwater, the channel between the Western light-vessel and Santa Maria mole is about 360 yards in width ; and that between the Eastern light-vessel and Santa Teresa mole about 154 yards. The breakwater at both extremities is terminated by two blocks on the inner side, each measuring 159 yards in the direction of the

continued on and after the 14th October, 1881, and a small dioptric light will be exhibited whilst the alterations are in progress. Further particulars will be given previous to the re-exhibition of the permanent light.

Note.—Mariners are cautioned that the temporary light will not be visible at so great a distance as the permanent light.

435.—SOUTH AUSTRALIA.—*Rivoli Bay, Beachport.*—The temporary red light exhibited from the north end of Beachport jetty will, on and after the night of the 1st September, 1881, be replaced by a *fixed red* light, shown from the south end of the jetty. The light will be 10 feet above ordinary high water mark, and visible at a distance of from $4\frac{1}{2}$ to 5 miles. Vessels bound to Beachport during the night, after passing Penguin island at half or quarter of a mile distant, should not haul up for the jetty until the red light bears N.W. by N.

436.—AUSTRALIA.—*South Coast.*—*Port Philip Entrance.*—(1.) *West Channel.*—*Particulars of Pile Light.*—With reference to Notice, No. 406, p. 897, on the exhibition of a light from a lighthouse built on piles in 15 feet water, on the north-east side of West sand, West channel, port Philip entrance,—further notice has been given that the light shows *fixed white* between the bearings of N.E. by N. (through west) and S. by E. $\frac{1}{4}$ E., and *fixed red* in all other directions. Elevated 31 feet above high water, and visible from a distance of 11 miles.

Note.—The red light is cut to mark buoy No. 5 of the West channel, and the black buoy off Prince George bank. Vessels should pass half a cable eastward of the lighthouse.

(2.)—PORT PHILIP.—*Geelong Harbour.*—*Light on Railway Pier.*—It is a *fixed red* light, visible from a distance of 4 miles. *Variation*, $8\frac{1}{4}^{\circ}$ E.

437.—North America.—*West Coast.*—*Vancouver Island.*—(1.) *Race Islands Fog-signal—Alteration in Character.*—On August 18, 1881, the following alteration would be made in the character of the fog-signal on Race islands, off the south-east point of Vancouver island. The signal is a 12-inch steam whistle placed on Race rock a short distance south-east of the lighthouse, which, during thick or foggy weather, will give blasts of *five seconds*

of H.M.S. *Doterel*, sunk in Sandy point road, the buoy previously marking the wreck has been replaced by a buoy painted green and carrying a white flag. The least water over the wreck is stated to be 6 fathoms.

440.—WEST INDIES.—*Venezuela*.—*Alteration in the Bar at Maracaibo*.—The bar at this place has been found dangerous, especially during and after bad weather; also, the channel westward of Bajo Seco island, formerly used, but discontinued on account of its having filled up, has again been found practicable—the steam vessel *Maracaibo* having recently passed out by it. *Variation*, 5° W.

441.—UNITED STATES.—*Rhode Island*.—*Whistling Signal-buoy off Block Island*.—On or about October 27, 1881, a whistling signal-buoy was moored on South West ledge, off Block island, in about 10 fathoms water. This buoy is painted with red and black horizontal stripes, with *S.W. Ledge* painted in white letters on the middle black band. It is surmounted by a whistle operated by the motion of the sea, and giving blasts at short intervals. Block island S.E. lighthouse bears E. by N.; Block island north lighthouse, N. E. $\frac{3}{4}$ N.; and Montauk point lighthouse, W. $\frac{3}{4}$ S.

442.—UNITED STATES.—*Massachusetts*.—*Fog-signal at Holmes' Hole (West Chop) Light-station*.—On and after December 1, 1881, a steam-whistle will be sounded during thick and foggy weather from Holmes' hole (West Chop) light-station, western entrance to Vineyard haven harbour, giving blasts of 3 seconds' duration, followed by intervals of 27 seconds, as follows; blast, 3 seconds, interval, 27 seconds; blast, 3 seconds, interval, 27 seconds.

443.—CANADA.—*Bay of Fundy*.—*St. John*.—*Split Rock Automatic Buoy*.—*Alteration in Position*.—Also, with reference to Notice in 1880, on placing an automatic signal buoy with Split rock—approach to St. John harbour—bearing N. $\frac{1}{4}$ E., distant 2 miles; the buoy has been moved nearer the shore, and now serves as a guide into Musquash harbour; it is painted black, and moored in 30 fathoms water, with the following bearings and distance, viz.:—Musquash lighthouse, north, distant $1\frac{1}{2}$ mile; and Split rock, N.E. Position, lat. $45^{\circ} 7' 15''$ N., long. $66^{\circ} 13' 55''$ W. *Variation*, $19\frac{3}{4}^{\circ}$ W.

No.		s.	d.
58	Mediterranean, gulf of Iskanderún:—Ayas bay or Mortalik	1	0
2660b	China sea, southern portion... ..	2	6
2657	Japan :—Gulf of Tokio or Yedo. (Plan Yokohama bay)	2	6
2006	Scotland, west coast :—River Clyde from Greenock to Dumbarton	2	6
2400	Plan added. Black cliff or Losing island.		
788	Plans added. Port Chaul. Port Dabhol.		
2530	Plans added. Año Nuevo ; San Simeon ; Santa Cruz ; Coxo, harbours. San Luis Obispo bay. Santa Monica.		
2727	Plan added. St. Paul island.		
936b	Plans added. Port Moueo. Muendu bay.		
1892	Plan added. Port Arthur.		
944	Plan added. Port Talindac.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No.	
183.	Labrador :—Camp islands to Mecklenburgh harbour.
1480.	China :—Yang-tse-Kiang.
2149.	Eastern archipelago :—Banka and Gaspar straits.
1415.	Ireland, east coast :—Dublin bay.
4.	Indian ocean :—Principal groups of Chagos archipelago.
2081.	Ceylon, east coast :—Caratievos to Pedro point.
888.	South America, east coast :—Rio Mossoro to San Roque.
876.	Newfoundland :—Broyle harbour to Renewse harbour.
2580.	North America, west coast :—Diego bay to cape Mendocino.
2880.	North America, east coast :—New Bedford harbour.
1100.	Pacific, Arzobispo isles :—Port Lloyd.
214.	Pacific ocean :—Solomon islands.
1548.	England, east coast :—Yarmouth and Lowestoft roads.
2169.	Pacific ocean :—Midway island and Welles harbour.
2727.	North America, east coast :—Cape Breton island.
2441.	Japan :—Strait of Tsugar.

voyage, every person not being in Her Majesty's Service, or not being duly authorised by law for the purpose, who—

- (a.) Goes on board the ship without the permission of the master before the seamen lawfully leave the ship at the end of their engagement or are discharged (whichever last happens); or,
- (b.) Being on board the ship remains there after being warned to leave by the master, or by a police officer, or by any officer of the Board of Trade or of the Customs,

shall for every such offence be liable, on summary conviction, to a fine not exceeding twenty pounds, or at the discretion of the court to imprisonment for any term not exceeding six months; and the master of the ship or any officer of the Board of Trade may take him into custody and deliver him up forthwith to a constable to be taken before a court or magistrate capable of taking cognizance of the offence and dealt with according to law. And whereas by Section 6 of the said Act it is further provided that whenever it is made to appear to Her Majesty—

- (1.) That the Government of any foreign country has provided that unauthorised persons going on board of British ships which are about to arrive or have arrived within its territorial jurisdiction shall be subject to provisions similar to the provisions contained in the last preceding section as applicable to persons going on board British ships at the end of their voyages; and,
- (2.) That the Government of such foreign country is desirous that the provisions of the said section shall apply to unauthorised persons going on board of ships belonging to such foreign country within the limits of British territorial jurisdiction:

Her Majesty may by Order in Council declare that the provisions of the said last preceding section shall apply to the ships of such country, and thereupon, so long as the Order remains in force, those provisions shall apply and have effect as if the ships of such country were British ships arriving, about to arrive, or which had arrived at the end of their voyage:

Stip. Mag.; Curling and French, N.A. Master in default for approaching the land at too great a speed and for neglecting the use of the lead, but under the circumstances stated, the Court considered a reprimand sufficient.

1121. *Afton*, s.s., and *Allegro*, schooner; the former built at Paisley, 1877; owned by Messrs. P. Barr; tonnage, 151; Belfast to Ayr; grass seed; the latter built at St. Mary's, Scilly, 1851; owned by Mr. M. J. Brady; tonnage, 89; Greenock to Foynes; coals; in collision near Corsewall Light, September 15, 1881. Inquiry held at Dublin, October 15, 1881, before O'Donel, Judge; Parish and Beasley, N.A. Master of *Afton* in default for leaving the deck during his watch. Certificate suspended for six months; recommended for one as mate.

1122. *William Gowland*, brig; built at Sunderland, 1839; owned by Mr. Fidler; tonnage, 219; Erith to Middlesborough; ballast; stranded on Smithic Sand, and subsequently beached near Bridlington Pier, September 24, 1881. Inquiry held at Middlesborough, October 13, 1881, before Coleman, Judge; Castle and Kennedy, N.A. Master in default for not using the lead, but considering his long and good service, he was merely reprimanded.

1123. *Roumania*, s.s.; built at West Hartlepool, 1879; owned by Mr. W. Gray; tonnage, 888; Cronstadt to Rouen; oats; stranded on the Leman and Owers Shoal, and subsequently abandoned in the North Sea, September 24, 1881. Inquiry held at Middlesborough, before Coleman, Judge; Castle and Kennedy, N.A. Both master and mate in default, the former for negligent navigation, and the latter for disobeying the master's orders. Certificates suspended for three months respectively.

1124. *Leversons*, s.s.; built at Sunderland, 1878; owned by Mr. F. Gordon and others; tonnage, 916; Cronstadt to Riga; ballast; lost on a reef near Filsland Island, Baltic, July 22, 1881. Inquiry held at North Shields, October 12, 1881, before Baker and Jacksons, Justices; Harris and Wilson, N.A. Master and second mate in default for steering dangerous courses, and for failing to keep a proper look-out. Certificates suspended for three months respectively.

1128. *Gertrude*, barque; built at South Shields, 1856; owned

Naval Court held at Valparaiso, August 22, 1881. Master reprimanded and cautioned to be more careful in future.

1117. *West Cumberland*, s.s.; stranded at Kullaground, September 29, 1881. Naval Court held at Copenhagen, October 6, 1881. Chief officer to blame for not keeping a good look-out. Certificate suspended for four months.

1125. *Gosford Packet*, screw ketch; lost on the coast near Sydney, June 28, 1881. Inquiry held at Sydney, August 22, 1881. Master free from blame.

1126. *Canton*, s.s., and *Morpeth*, s.s. In collision at the entrance of the harbour, August 8, 1881. Inquiry held at Newcastle, N.S.W. Both vessels in charge of pilots. Pilot of the *Canton* to blame for bringing so long a vessel into port at night. Deserving of severe censure.

1127. *Annie Cochrane*, schooner; stranded at Nambuccra. Inquiry held at Sydney, August 15, 1881. Master free from blame.

1129. *Teuton*, s.s.; totally lost off Danger Point, South Africa, August 30, 1881, when great loss of life ensued. Inquiry held at Cape Town, August 30, 1881. Casualty attributable to injudicious navigation adopted by the master, who was drowned.

1190. *Tainui*, s.s., and *Christina*, schooner; in collision in Auckland Harbour, June 1, 1881. Inquiry held at Auckland, August 10, 1881. Master of *Tainui* to blame for disregard of regulations. Certificate suspended for one month.

1133. *Maria*, barque; lost on the rocks near Bay du Cap, Mauritius, July 18, 1881. Inquiry held at Mauritius, August 31, 1881. Master to blame for want of prudence and error in judgment. Court unable to deal with his foreign certificate.

1135. *Birkby*, barque; stranded near Point Pedras, Coast of South America, August 14, 1881. Naval Court held at Pernambuco, October 12, 1881. Master guilty of negligent navigation. Certificate suspended for six months.

1136. *Planet*, schooner; stranded on De Lambre Reef, Western Australia, July 15, 1881. Inquiry held at Freemantle, September 5, 1881. Master guilty of negligent navigation. Certificate suspended for six months.

information relating to the Typhoons and Monsoons of the China Seas; and (3) to obtain a series of observations in terrestrial magnetism. The work of this observatory, compared and collated with that done at Pekin, Shanghai, Manila, Batavia, and Japan, where continuous observations have been made for some time past, should throw a flood of light on many phenomena, meteorological and magnetic, and be essentially serviceable to navigators in the Eastern Seas.

DANGERS IN LOCAL NAVIGABLE CHANNELS.—Mr. James Currie, of Leith, has addressed a letter to the Hydrographer of the Admiralty pointing out that in Loch Cairnbalm a detached rock with 11 to 12 feet at low water springs exists in the south channel of Eilean-na-Gawn, about midway between the 5 fathoms and $3\frac{1}{2}$ fathoms soundings, and about 200 feet distant from Eilean-na-Gawn, and that this rock is not shown on the Admiralty chart of the locality. Mr. Currie at the same time urges the desirability of enlisting local knowledge by offering rewards for the discovery of unsuspected dangers in important navigable channels and anchorages; pointing out that the rock in question was well known to the natives of the district as the "Pul-na-Gawn rock," and that there is little doubt they would have communicated this information under a pecuniary stimulus administered in the manner suggested. We should think that if Mr. Currie's suggestion were carried out there would be no end to the rocks and shoals reported from different parts of the coast. As a matter of fact, Admiralty surveyors do enlist local knowledge in all cases where they survey localities.

THE GALE OF OCTOBER 13TH AND 14TH, 1881.—At the opening meeting of the Meteorological Society, held on Wednesday the 16th inst. at the Institution of Civil Engineers, an account was given of "the Gale which passed across the British Isles, October 13th-14th, 1881," the paper having been prepared by Mr. G. J. Symons, F.R.S., with the assistance and co-operation of Mr. C. Harding and other gentlemen. There is evidence of the storm being formed in the Atlantic about 150 miles S. of Nova Scotia on October 10th, and that at noon on the 13th there was a considerable disturbance about 600 miles W. of Galway. At that

pressure. He suggested that a conference of delegates from societies specially interested in the subject should be held, who should make experiments and carefully consider the whole question.

UNUSUALLY HIGH TIDES IN 1882.—In the months of January, February, and March of the year 1882, owing to the moon in perigee and new moon occurring, in each month, within a very short interval of time, the tides that follow the new moon will be unusually high, especially those of February 20th and 21st, and of March 20th, 21st and 22nd; and should the wind at the time be such as to favour the progress of the tide wave, the tides will be exceedingly high in the Thames.

MERCANTILE MARINE SERVICE ASSOCIATION OF
VICTORIA, N.S.W.



AN Association similar to those which have done so much good in Great Britain and elsewhere, has been formed in Melbourne, and although only about two months since the first meeting was called it has gone ahead so fast that its delegates are now sitting in joint-committee on a proposed new Marine Board, and on which it is proposed to seat a representative of the Association with every prospect of improving the whole Mercantile Service.

The Victorian Mercantile Marine is formed on a somewhat similar basis to that of Liverpool, and at present numbers some 150 members, all certificated men (the Marine Engineers had previously formed a very powerful association for themselves), and there is every prospect of an increase of members, the secretary being busy corresponding with the neighbouring colonies with a view to consolidating the whole of the branches which may be formed into one great Australasian Association, and has already succeeded in establishing a branch in South Australia, numbering some seventy certificated members. Sydney has some 150, and

the formation of branches in Tasmania and New Zealand progress. When this is done there will be an amalgamation of an Australasian Association with one set of general rules, leaving each district to regulate its own working to the best advantage. Some eight or ten years ago Captain M'Callum tried to form a similar association in Melbourne but was unsuccessful, and Mr. Robinson, the present Secretary of the Victoria Association, a short time previously, tried in N.S.W. but also without success, but though baffled he was not beaten, and he continued agitating until events took a very severe turn, and the first persons to come from the want of such an Association were the seagoing engineers who were thus forced to take the matter in hand to protect themselves, and succeeded in forming the Australasian Institution of Marine Engineers, second to none in the world and a credit to the profession. Now the other mercantile officers, seeing the tremendous power for good of this institution, and getting the support of the leading masters and officers together with the support of the present office-bearers, have succeeded in enrolling members, obtained the Governor's patronage, and one of the leading merchants of Melbourne for president, as well as the support of the Vice-Chief Justices of the Supreme Court. Reading rooms in the heart of the city and yet within five minutes walk of the principal wharves have been secured, and members of kindred associations have been cordially invited to use the reading room, and if they do become members of the Association. Invitations are also sent to the various home vessels in port when the monthly meeting is held—the first Monday in the month.

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